

# **Labelling Agricultural Tyres at Trelleborg Company:**

Possibilities and Constrains

**By**

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**LUMES, Lund University International Master's Program in Environmental Science**  
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## SUMMARY

The thesis attempts to investigate the possibilities and constrains to choose one of the environmental labelling and declaration tools of ISO 14020 series for the agricultural tyres. The thesis sheds light on the requirements, benefits and constrains of the environmental labels and declarations. It also defines the main stakeholders of environmental labels and declarations (EL) who put the pressure on the Company to produce environmental information. To get a closer idea about its stakeholders and a better understanding of the general environment where the Company operates, the author analyses and discusses the achievements of Trelleborg competitors. Finally, the author proposes a short and long term strategy to implement ISO 14020 series within Trelleborg Company, attempting by that to choose the most feasible environmental communication and marketing tool for Trelleborg and its stakeholders.

To conceptualize and understand the current and future dynamics of implementing labels and declarations as well as evaluate the relationships and links between the actors and different issues, the Causal Loop Diagrams are used. The SWOT analysis approach is also used to evaluate the issue of labelling with current and future considerations.

Having addressed the current situation of agricultural tyres with their environmental impacts at Trelleborg Company and the outsourcing suppliers, having reviewed the requirements and principles of the environmental labels and declarations in ISO 14020 series. And having analyzed the situation of EL in Europe and in other companies, self-declarations are considered to be the most desirable and feasible option in the short term. This option fits the current needs and profile of Trelleborg Company. Given the high requirements of eco-labelling and life cycle analysis based Product declarations compared to the technical, financial and HSE preparedness of the Company and the outsourcing suppliers, the author suggests that these environmental management tools shall be investigated in the medium and long term respectively. However, life cycle thinking should accompany the adoption of all types of ISO 14020.

Key words: *ISO 14020 series, agricultural tyres, Trelleborg Company, possibilities and constrains, short and long term strategy.*

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**LIST OF ABBREVIATIONS**

BLIC:	<i>Bureau de Liaison Des Industries du Caoutchouc de L'Union Européenne</i> (The Association of European Rubber Manufacturers)	ISO:	International Standard Organizations
BUFF's:	Business Unit Forest & Farm Tyres	IPP:	Integrated Product Policy
CO <sub>2</sub> :	Carbon Dioxide	LCA:	Life Cycle Analysis
CLD:	Causal Loop Diagram	NGOs:	Non Governmental Organizations
EL:	Environmental Labels and Declarations	PAH:	Polycyclic Aromatic Hydrocarbons
EMS:	Environmental Management System	PR:	Producer Responsibility
EMAS:	European Eco-Management and Auditing System	SIT:	Standard Implement Tyres ( <i>Vicafors</i> )
EPA:	Environmental Protection Agency	SIS:	Swedish Institute for Standards
EPDs:	Environmental Product Declarations	SO <sub>x</sub> :	Sulfur Oxide
EPR:	Extended Producer Responsibility	SNF:	Swedish Society for Nature Conservation
ETRTO:	The European Tyre and Rim Technical Organization	STRO:	Scandinavian Tyre and Rim Organization
EU:	European Commission	SWAN:	Nordic Eco-labelling Scheme
FAO:	Food Agriculture Organization	SWOT:	Strengths, Weaknesses, Opportunities and Threats
FSI:	Federation of Swedish Industries	TR:	Technical Report
GEC:	Good Environmental Choice	VAT:	Tax of Value Added
HSE:	Health, Safety and Environment	ZnO:	Zinc Oxide
		QS:	Quality System
		WTP:	Willingness to Pay

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" We must begin to see the possibility of evolving a new life style, with new methods of production and new patterns of consumption; a lifestyle designed for permanence."

E.F. Schumaker

## CHAPTER 1: INTRODUCTION

### 1. 1 BACKGROUND

As global resources are continuously diminishing and consumption patterns consistently expanding, recent years have witnessed rapid growth in the care of companies to adopt environmental management tools within their work. One of which is the environmental product labelling. Many companies nowadays begin to compete for profits not only offering better quality products but also by offering environmentally friendly products. As tyre manufacturing increases with the escalating demands of customers, this will also increase the consumption of rubber products and the use of non-renewable products, emissions to the air, water and soil during the manufacturing and usage stages, which create problems at the level of health, safety and environment (HSE). Thus, the rubber industry, as other manufacturing industries, has started to give more interest to the environmental questions related to their production and products. To diminish these impacts, many endeavors have been put by government, industry and associations and other stakeholder of the society.

To push companies to produce in a cleaner manner and incite consumers into more rational purchasing decisions, the first eco-labelling scheme was one of the business tools (e.g. eco-efficiency and clean production), which was introduced by the German government in the late 1970's. Today, eco-labelling programs exist in developed as well as a number of developing countries including Brazil, India, Indonesia and Thailand. Products such as paint, washing detergent and paper were among the first to become labeled for improved environmental standards. In the agricultural sector, products indicating organic or bioorganic production have been marketed for many years (FAO Sourced October 1998).

Eco-labelling is designed to influence all consumers, the definition of consumers encompasses all individuals and organizations making purchase decisions regarding products and services, ranging from procurement officers of governments and corporations to individual retail consumers. It can be viewed as an attempt to bridge reconciliation between nature, economy and environmental impacts. Nordic countries have started by the Swedish Society for Nature Conservation (SNF) initiation of the "Good Environmental Choice" in 1987 and the Nordic Council of Ministers Swan label in 1989. However, environmental consumer product labels, or "eco-labels", are proliferating and attracting the attention from many supporters and opponents. Domestic and international regulators have struggled to keep pace with the growth of eco-labelling, self-declaration claims and third party programs. While the regulatory landscape remains fluid, it is always sustainable (present and future considerations) to work on the basis of precautionary principle and beyond compliance (Cadwell 2000).

Based on the Principle of "Producer Responsibility" (PR), it is up to the companies to take care of their products first (FSI 1998). Thus, self-declarations might help companies to facilitate the distribution of environmental information "business to business" because they are considered as complex information for private customers (European Commission EC 1998).

With the hot debate being placed on how companies can produce clean, how people can rationalize their consumption, how resources can be managed efficiently and on product related impacts. A set of standards were set to give more attention to the product, and to the consumer who is to influence the producers through his or her choice of products at the micro level. Thus, International Standards Organization (ISO) came to deal with environmental issues through the influence of the economic actors (companies).

Trelleborg Company as many others, has been trying to enhance its environmental performance to satisfy its stakeholders. Trelleborg as many other companies now view environmental performance as a benchmark to their marketing strategy, for it opens opportunities for them to increase their market share at the end and strengthens their image vis-a-vis their stakeholders including customers, employees, competitors, regulators and shareholders

(Environmental Annual Report 1999, 2000). As a part of its management systems, Trelleborg has already integrated ISO 9001 into the Forest and Farm Tyres Unit, which is a certificate that is used to enhance the quality system of the Company. In 2000, it adopts ISO 14001, that is the standard that focuses on the environmental management system of the Company covering the environmental policy, objectives, targets, communication, monitoring, audit, management review and so forth. To meet the needs that fits the demand of their stakeholders, Trelleborg investigates the possibilities of implementing ISO 14020 series in their agricultural tyres that the author would consider to include both *forest and farm tyres* (Trelleborg Wheel Systems 1999). Its ultimate aim is to primarily satisfy the needs of tyre dealers (direct customers) and local authorities and institutions (indirect procurers), and provide them with environmental product information to choose the "good level" environmental products among competitors. One of the tools to assess this good level is said by some national and international organizations (ISO) to be environmental labelling and declarations.

## 1. 2 OBJECTIVES AND SCOPE

This thesis attempts to investigate the possibilities and constrains of implementing environmental labels and declarations (EL) for the agricultural tyres. To meet this inquiry, the author will proceed by defining the main stakeholders to Trelleborg Company for the integration of ISO 14020 series. The author will also shed light on the general requirements, possibilities and constrains of ISO 14020 Series, attempting by that to choose the most feasible environmental communication and marketing tool for Trelleborg and its stakeholders. Finally, the author aims at proposing a short and long term strategy to implement ISO 14020 series within Trelleborg.

## 1. 3 METHODOLOGY AND MATERIAL

The methodology of the thesis involved a study of the literature to develop a general understanding of the rubber industry, and Trelleborg Company, their production and environmental aspects, and objectives, as well as an understanding of the labelling concept in general. Literature was also of great use to this thesis when it comes to know the requirements for implementing ISO 14020 series. To shed light on the regulatory framework of eco-labelling in Europe and the world, e-mails and/or interviews with academic specialists, rubber stakeholders, and environmental labelling professionals and authorities were also of great use to perform the inquiry of this thesis.

To analyze the influence of ISO 14020 series on Trelleborg competitors, combination of questionnaires, e-mails, and phone calls was alternatively used to contact the main competitors of Trelleborg; as identified by the Technical Manager of Trelleborg Company. They are as follows Alliance, Goodyear, Firestone, Nokian Tyres, Michelin, Taurus Rubber Company Ltd, Vredestein Banden B.V and Continental. To know if Trelleborg should go for ISO 14020 series or not, the author deemed it necessary to have an overview study about what ISO current stand at the domestic/international level, not only for Trelleborg but for competitors as well.

To define the problem of investigating the possibilities of adapting ISO 14020 series within Trelleborg Company, Causal loop diagrams (CLDs) were drawn to conceptualize the issues at hand and helps the author investigates the different possibilities (scenarios) of implementing the EL. The CLDs presented in Part 1.6 are based on the approach of "System Thinking". This is based on system dynamics that looks at all the factors and actors that influence the issue in an integrated manner, which allows the reader to holistically and deeply view the problem with present and future considerations (See Figure 2-5).

To consider the possibility and constrains of eco-labelling, there are not yet official criteria developed for agricultural tyres. However, the author did hypothetically investigate the issue of possibilities and constrains of eco-labelling because of the following reasons:

- Given the high credibility of SWAN-the Nordic Eco-labelling scheme- among Swedish people, customers and producers (SIS Eco-Labelling September 23, 2000);
- Given the enthusiasm of some members states of the rubber industry, who are for the development of eco-labelling criteria for tyres (e.g. Germany, Norway, Italy, Denmark) (Cinaralp April 7, 2000);
- Given the dynamism of standard organizations to improve the product policies using different tools: EL, Environmental Management System, Life Cycle Analysis (LCA) and so forth;
- Given the contribution of European Commission to and interest in the eco-labelling issue that was

crowned by their feasibility study for eco-labelling of passenger car tyres, which probably gives more chance to agricultural tyres to undergo the same policy development in the near future (Mistry; Ogilvie 2000) and;

- Given the interest of Nordic countries in the eco-labelling issue that was reflected in the criteria document for eco-labelling passenger car tyres since June 1999 (not licenses yet) (Swedish Standardization November 10, 2000).

Given the fact that environmental product labelling (prone to all types) is a marketing concept, which generally aims at making the consumer more aware and consuming to more "environmentally-friendly" products, the SWOT Approach was chosen because the labelling issue basically depends on the ultimate goal of marketing the product. The approach stands for the use of strengths, weaknesses, opportunities and threats indicators of Trelleborg to meet the objectives of the study. It is an appealing approach to use in communication with companies because most of them use it as in their marketing departments.

**Figure 1: SWOT elements of agricultural tyres at Trelleborg Company.**

Source: Interview with the Marketing Manager at Trelleborg, September 19, 2000.

Figure 1: not included for property rights reasons.

Figure 1 divides the approach into four major elements: strengths, weaknesses, opportunities and threats that environmental performance could potentially bring about. The SWOT analysis Figure is useful in the sense that it gives information about the current situation of agricultural tyres at Trelleborg Company, some of which help the author to analyze the current and future situation of agricultural tyres in the world market, and which shall help the author to see if Trelleborg Company can go for eco-labelling or self-declarations.

#### 1.4 SCOPE AND LIMITATIONS

Agricultural is divided to two main categories: diagonal and radial tyres. The difference between the radial and diagonal tyres is the construction of the carcass and the difference in cord thread angles (radial 90, diagonal 30-40 degrees) (Victor September 29, 2000). Unlike diagonal tyres, which are produced in Trelleborg Company, radial tyres branded Pirelli are manufactured in Italy in a joint venture with 60% Trelleborg shares (Lindvall *Pers.Comm* October 2, 2000). The scope of the thesis will however be limited to the diagonal tyres, but the same final proposed strategy can be applied for radial tyres once they reach an acknowledged level of HSE records.

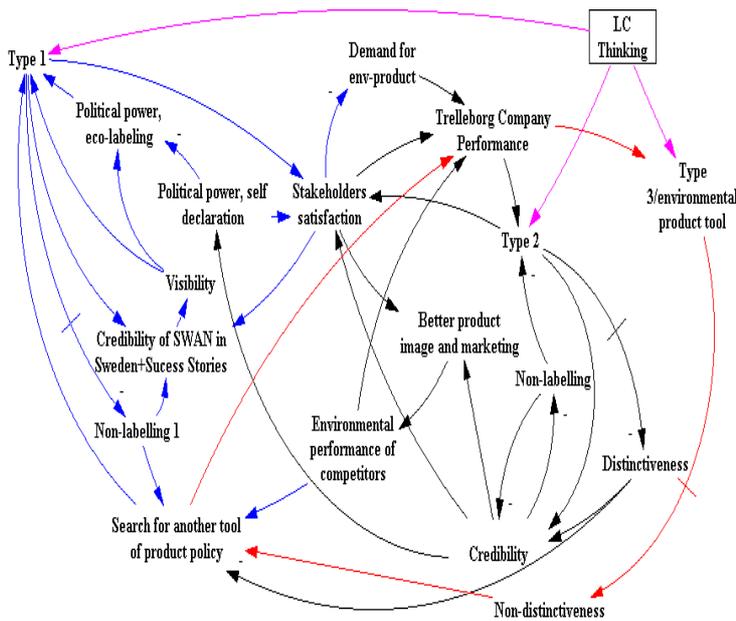
The thesis will not go into developing the technical requirements of ISO 14020 Series or the HSE requirements of compatible tyres. Compatible tyres are defined by the Swedish Tyre Industry Information Council as tyres requiring the use environmentally raw material, low rolling resistance, low noise level, long life tyre, environmentally adapted production etc. The thesis aims at setting the strategic possibilities and constrains of the adoption of environmental labels and declarations, and not giving the very technical details that agricultural tyre should meet. Finally, getting *direct* information from the tyre dealers would have made the thesis get more input. However, this was not possible because these parties were not accessible or reachable.

#### 1.5 PURPOSE OF STUDY

The author has chosen this subject because EL is a debatable and hot issue that draws the attention of all stakeholders of society including academics, industry representatives, politicians and so forth. The interest of the author to the EL also stems from an academic curiosity in and interest to work with practical issues as related to Environment and Industry, where the author intends to use all the new knowledge gathered and skills gained during LUMES Programme.

#### 1.6 PROBLEM DEFINITION

**Figure 2: Causal Loop Diagram of the problem definition**



The Causal Loop Diagram in Figure 2 is used to visualize and conceptualize the theoretical cycle that Type I, II and III would achieve (Khure 1997). Theoretically speaking, environmental product labelling is a marketing tool that would increase the stakeholders confidence in the environmental quality of the Company product, which would ultimately help the Company market their products. The non-labeled arrows (+) are reinforcing factors. The labeled arrows (-) are hindering factors. The arrows with (/) are delayed factors. The causal loop was drawn in such way that it reflects the continuous process of customer demand (stakeholder satisfaction). The author sees that this is an important factor to consider. It is important because it takes into consideration the growing demand for green products and green production. This point will

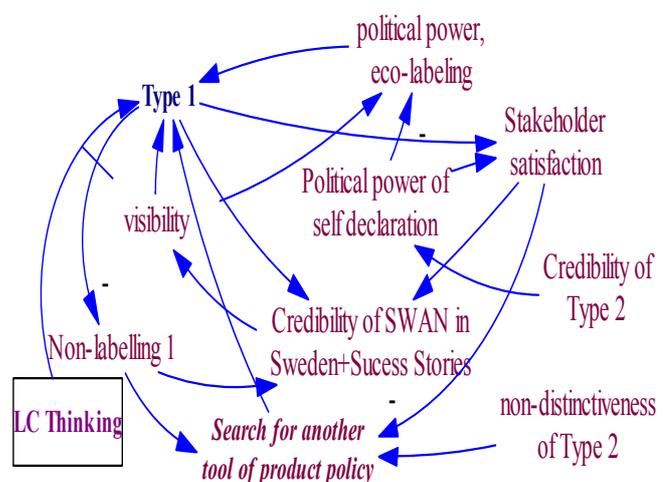
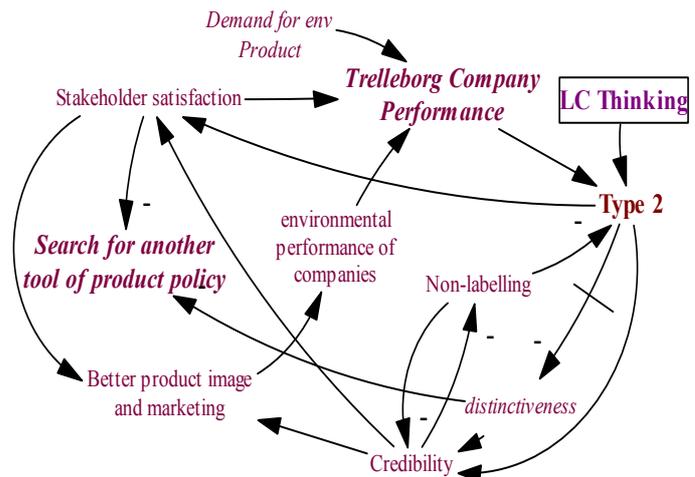
be approached further in the thesis.

Figure 3, 4&5: Causal loop diagrams showing three hypothetical specific scenarios to deal with the labelling issue.

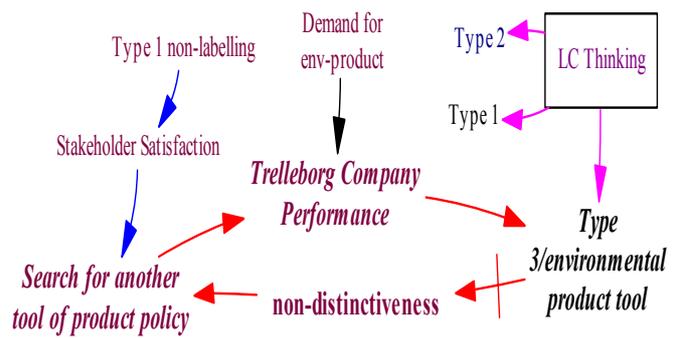
The causal loop diagrams show three hypothetical specific scenarios.

*Scenario 1* shows that more demand for environmental tyres, would push probably Trelleborg Company to opt for one of the product environmental tools. Since the self-declarations are easier in the meantime, this would probably push some competitors to produce the same. However, in the long run, the self-declarations might become too popular and un-distinctive, which would push the stakeholders to demand for another benchmark for product "friendliness", which would decrease the political power of ISO type II and enhance that of type I.

*Scenario 2* points out that once the self-declarations loose their credibility, the political influence of eco-labelling will increase especially if there are still many success stories of eco-labelling third parties (e.g. SWAN), which would push competitors to steer this way. Once many companies eco-label their products, this would probably also lead to non-labelling of the products for they might loose their distinctiveness, which would decrease the credibility of the eco-labelling and push companies to search for a new policy tool for environmental products.



*Scenario 3* shows that the LC thinking is the prerequisite for developing both eco-labelling and self-declarations. Non-labelling of type I would probably push Trelleborg Company to search for a new tool of product policy. It also shows the general pattern and actually the root of the problem that would repeat itself once self-declarations and eco-labelling would start to play a less influential role in the market. Once the environmental tools become non-or less appealing to the stakeholders and not credible, Trelleborg Company as well as other competitors would search for another tool that would satisfy the new environmental demand of its stakeholders. Thus, choosing one of the types of ISO 14020 series is not conceptualized as an end in itself but as a process of environmental performance.



**1.7 THESIS OUTLINE**

The thesis is presented in six chapters. In the first chapter a brief introduction, methodology used in this study, scope, limitations and outline are presented. Chapter two reviews the current situation of agricultural tyres at Trelleborg Company. Chapter three presents the theoretical framework of ISO 14020 series. Chapter four examines and analyses the results and findings of the e-mails, interviews, SWOT analysis, of the theoretical information presented in the previous section. Chapter five discusses the various options of adopting ISO 14020 series. In the last chapter of the thesis, conclusions and recommendations for the study are presented to wrap up the whole issue of adopting ISO 14020 series at Trelleborg Company.

## CHAPTER 2: AGRICULTURAL TYRES: MARKET AND ENVIRONMENT

This chapter reviews the current situation of agricultural tyres at Trelleborg Company and the outsourcing suppliers. It aims at giving a brief and concise description of the different stages of the tyre manufacturing processes, as well as a concise understanding the environmental impacts and market share of the product in Sweden, and the rest of the World. Finally, the chapter briefly presents some of the parameters of compatible agricultural tyres with special focus on TWIN tyres as they are the most complying by HSE considerations.

### 2.1 DEFINITION OF PRODUCT GROUP

The product group consists of agricultural radial and diagonal agricultural and forestry tyres TWIN and standard tyres. HES attributes (environmental considerations) and construction of those types contains different and special functions and material compared to others of the past (from 1970's to 2000), which makes them more or less suitable for "potential" labelling or declarations.

### 2.2 MARKET OVERVIEW

Trelleborg Wheel Systems develops, manufactures and markets complete wheel systems for forest and farm machines, trucks and other material-handling equipment. The business area consists of four business units (Figure 6), one of which is the Forest & Farm Tyres and Agricultural Radial Tyres develop, manufacture and market a wide range of tyres and wheels for forest and farm machines (Trelleborg homepage November 10, 2000).

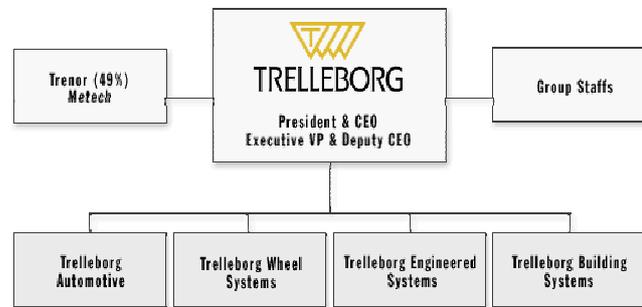


Figure 6: Organizational Structure of Trelleborg Company

Based on this Figure and given the size of the competitor companies in the world market, it is quite easy to understand why the Farm and Forest Business Unit Controller considers Trelleborg Company as a "small producer". The main competitors, according to Trelleborg are shown in the Figure: Michelin, Bridgestone, Goodyear and Continental. The Figure was taken from Firestone homepage and does not exactly show Nokian Tyres or Trelleborg Company shares.

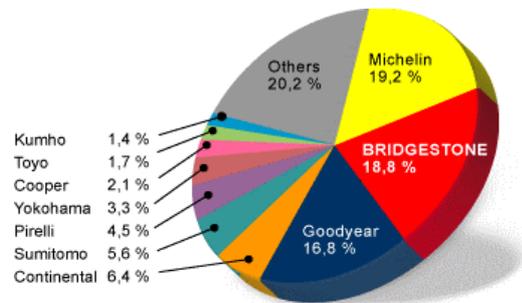


Figure 7: World market share of tyres  
Source: Tyre Business, Firestone Europe

### SALES FOR AGRICULTURAL TYRES

The turnover for the Business Unit Forest & Farm Tyres (BUFF's) is approx. 700 MSEK. Almost 90% of the turnover is tyres and wheels for agricultural and forestry. The main markets for Trelleborg BUFF's are in Europe and primarily in Northern Europe including Scandinavia. Outside Europe they mainly focus on the markets in North and South America and in South Africa. Today the tyres sold are produced both the BUFF's wholly owned factories in Sweden and Sri Lanka as well as in outsourcing factories in Poland, Byelorussia, USA and Romania. The customer requirements regarding environmentally friendly tyres are almost non-existent. However in EU and especially in Sweden there are some concerns and requests from customers regarding the level of Nitrosamines as well as environmental friendly oils. The spearhead

products for BUFF are the TWIN agricultural and forestry tyres. Other products of importance are the Viskafors implement tyres and the Trelleborg lawn and garden tyres (Spencer. *Pers.Comm.* November 6,16 2000).

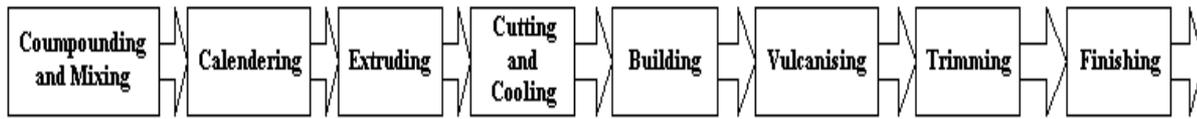
### 2.3 PROCESS OF PRODUCTION OF AGRICULTURAL TYRES

**Table 1: Process of production of agricultural tyres**

<b>Process of Production of Agricultural Tyres</b>
<p><b>COMPOUNDING AND MIXING:</b> In the mixing operation various grades of natural and synthetic rubber, blended in an internal mixer to meet specific compound requirements, are mixed with carbon black with 30 to 45 percent, and chemical products. There is usually between 10-15 ingredients in a compound (<i>Pers.Comm</i> Nordström September 21, 2000). In the compounding and mixing area, dry chemicals are weighed, put into small containers, and loaded into the rubber mixer. Purchased chemicals are witnessed to be weighed and sealed in bags. The mixed rubber is then discharged to a mill, which forms it into a long sheet. The hot, tacky rubber passes through an anti-tack solution, which prevents the sheets from sticking together as they cool. The rubber belt is placed into a long conveyor belt, which the application of cool water, lowers the temperature of rubber sheets. After cooling, the sheets of rubber are sent through another mill to warm up the rubber for further processing on extruders and calenders.</p>
<p><b>CALENDERING:</b> Calendering is the process, by which a fabric of textile or steel cord is coated with a film of rubber on both sides. Calendered textiles nylon and polyester are used for the casing and the cap plies. Steel cord is used for the belts. Calenders receive hot strips or rubber from mills and squeeze them into reinforcing fibers or cloth liked fiber matrices, thus forming thin sheets of rubber coated materials.</p>
<p><b>EXTRUDING PROCESS:</b> The tread and the side-walls (often two different rubber compounds) are formed into specific shapes through extruders. The extruders produce a continuous length of tread rubber, which is then cooled and cut to specific lengths. Extruders transform the rubber into various shapes by forcing it through dies via a rotating screw.</p>
<p><b>PREPARATION OF THE BEAD CORE AND THE BEAD:</b> The main component of the bead, the bead core is formed by coating plated steel wires which are wound on a bead former by a given number of turns to provide a specific diameter and strength for a particular tyre.</p>
<p><b>CUTTING AND COOLING</b> of the various extruded and calendered outputs.</p>
<p><b>BUILDING PROCESS:</b> assembling all of the components such as bead wires, coated fabrics, treads etc on a tyre building machine (drum). In this stage, extruded and calendered rubber components are combined (layered, and built-up) with wire, polyester, and other reinforcing materials to produce various rubber products. Adhesives, called cements are sometimes used to enhance the bonding of the various product layers. This assembling, reinforcing, pre-curing and bonding are referred to as building.</p>
<p><b>VULCANIZATION (CURING):</b> The tyre is placed in mould in a curing press and cured for a prescribed length of time at a specific pressure and temperature. During this process, the polymer chains of rubber matrix cross link to form a final product. Increasing the number of cross-links in the rubber matrix gives rubber its elastic quality. The tyre is then ejected from the mould having obtained its final size, shape and tread pattern. The curing system consists of the use of activators (like zinc oxide and fatty acid), accelerators and sulfur (heat resistance/adhesion). These components will be further discussed in Part 2.5.</p>
<p><b>TRIMMING:</b> Excess rubber resulting from the curing process is removed.</p>
<p><b>FINAL INSPECTION:</b> Each tyre is inspected visually. This is to ensure consistent and reliable performance.</p>

Source: Visit to Trelleborg Factory; Lüdtko *Pers.Comm.* October 2, 2000; EPA 1998; and Firestone homepage: <http://www.bridgestone-eu.com/fs/anniv.htm> (Sourced September 28, 2000).

Figure 8: Flow chart of the main process of tyre production



A rubber compound contains rubber polymers (natural and synthetic rubber). It also contains many other ingredients. The filling material normally carbon black, is strengthening. Carbon black, with different kinds (e.g. N220), size and appearance is used, steadies the mixture and improves the abrasion resistance, the tear resistance and the process (Lüdtke. Pers.Comm. October 2, 2000). That is to say that the higher the use of carbon black, the higher the rolling resistance and the higher the energy losses. Researchers are currently working on finding catalyzers, which shall lower the rolling resistance and require less heat. Oil is also parts of the mixture to soften the rubber polymer and to facilitate the admixture of powder chemicals. The curing system is number of chemicals with different functions: Sulfur atoms act like bridges between rubber molecules. The rubber changes from being plastical to being elastical. The curing demands heat and if sulfur is the only component the process would take very long to get ready. For that reason, accelerators and activators are used to speed up the curing process. The time for curing varies between 20 minutes to 3 hours depending on the size. The more rubber the tyre has, the longer it takes to heat the whole tyre. Protective agents are chemicals preventing the rubber from being prematurely demolished due to sunshine, ozone or exhaustion. Process gadgets are admixtures distributing the chemicals in the mixture and preventing the rubber from parching during the process (Victor 1994) (Lüdtke. Pers.Comm. October 2, 2000).

According to the Swedish Tyre Industry Information Council, natural rubber and the synthetic rubber tyres, styrene rubber and butadiene rubber, used in tyre production are prone to decay by the action of oxygen, ozone, and heat. Thus, it is necessary that ageing protection or what it called anti-degradants are added to the rubber. These consist of antioxidants, which protect against the decaying action of oxygen, and anti-ozonants, which protect against the effects of ozone, and thereby contribute to the increase of the life span of tyres (1998). Ageing protection is important component in order to ensure a long life span for the tyres and effective retreading capability. Paraphenlendiamines are chemicals which provide the best combination of all the properties of ageing protection (anti-ozonant and antioxidant effect etc). They are classed as being harmful to the environment (See Part 2.5).

2.4 THE ENVIRONMENTAL IMPACTS OF AGRICULTURAL TYRES.

Figure 8 shows a simplified life cycle of agricultural tyres Life cycle stages. The LC that the product goes through before the Company becomes involved are referred to as upstream stages. The stages that follow the Company's involvement are referred to as downstream stages. LCA might start from the extraction of raw material (cradle). However, for the sake of clarity and convenience, Figure 9 shows a simplified LCA which starts with the gate approach and that is the procurement of raw material and energy (natural gas and electricity) going through all the manufacturing stages, the distribution, the maintenance, and use and re-use stages after the disposal of the agricultural tyres (grave). The input is defined as the energy and the raw

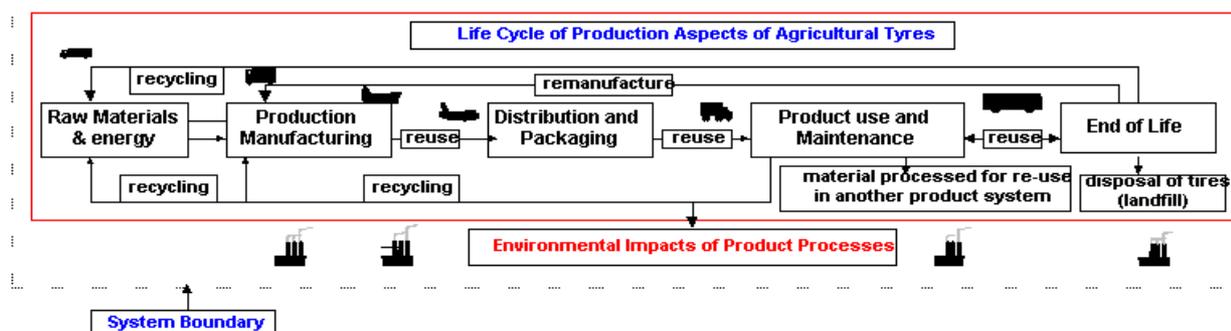


Figure 9: Life cycle of production aspects of agricultural tyres

material that enters the company. The output is defined as the environmental impacts of product processes (See Figure 10).

Raw materials come from different industries. The petroleum industry supplies the Company with different kinds of synthetic rubber, chemicals, fibrous material (nylon and polyester) for cord manufacture and carbon black from the oil. The forest industry produces rubber latex that is defined as natural rubber (NR). The mine and the steel industry bring minerals and steel, which are used, for rubber mixtures and manufacture of steel wires (bead cores) and steel cords (Victor 1994). This is cited just to understand the interconnection of this industry to others, which also theoretically should be responsible of the production of their products.

Energy Consumption: Trelleborg currently consumes 40% electricity (48,590,360 kWh/year) and 60% of natural gas (71,532,200 kWh/year). According to the environment report 1999, energy within the group is used for heating, ventilation, cooling processing, equipment, and transport. The total energy consumption of Trelleborg group in 1999 excluding transport amounted to 760 (623) GWh (gigawatt hour "1 billion watt hours"), of which oil accounted for 204 (123) GWh, electricity 304 (255) GWh, natural gas 247 (247) GWh and other sources for 5 (7) GWh. Consumption has increased by approximately 22 percent compared to 1998, which is partly due to the fact that new plants were acquired during the year such as Tivoli, Italy 1999.

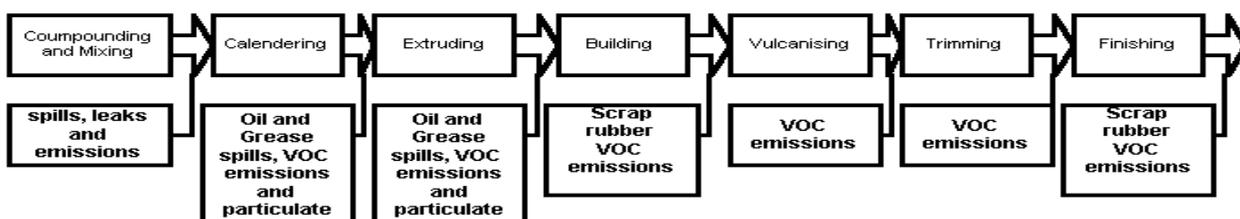
Then the rubber is processed. After being vulcanized as part of the manufacturing process, finished tyres become ready for delivery. The products are sent via channels (tyre dealers and modes of transport to customers. Once the tyre has been used and reached the end of their useful lives, they enter the scrap and recycling stream. In this context, it is to note that Trelleborg pays fees to support a system for the collection and recycling of used tyres as part of its producer's responsibility that covers tyre production. The chain that extends from raw material suppliers to landfills or recycling and recovery plants forms the physical route along which raw materials and tyres travel and cause impacts on the environment. The final stage of product chain, disposal of waste rubber (scrap tyres) which constitutes a serious environmental problem, which draw the attention of many stakeholders of society. As tyres are not biodegradable and, in their original form, are very persistent in the environment, Trelleborg deals with this problem through recovering post consumer waste and different reduction and recycling operations of waste tyre. *Dackrec* is the Company, which takes care of these waste issues at Trelleborg Company.

As it is shown in Figure 9, transport is also another component that is added to the life cycle of agricultural tyres. Truck transport is the most common means of transport of internal and external transportation of raw materials and finished products. Some of the goods are sent by train, boat or plane. Measures have been implemented to reduce the impacts of the logistics, especially given their increasing importance to the rubber manufacturing associations (e.g. BLIC) (Environmental Annual Report 1999).

The life cycle chain of agricultural tyres poses HSE problems, not only during manufacturing processes, but also during end of life management. Each of these affect the environment, health and safety in one or many ways one of which is the direct effect on the environment as regards production, consumption, reuse/recycling and landfill. In this respect, the impact of the following phases of production should be stressed when talking about labelling agricultural tyres (Victor, Nilsson *Pers.Comm* 2000).

**Figure 10: Flow chart of the main pollution outputs coming from the production processes of tyres.**

Source: EPA 1995, Trelleborg visit (Victor. *Pers.Comm.* August 2000)



**Table 2: The main pollution outputs of production processes for tyres.**

Source: EPA 1995, Trelleborg visit (Victor. *Pers.Comm.* August 2000)

TYRE MANUFACTURING PROCESS POTENTIAL POLLUTION OUTPUTS	
<b>Compounding</b>	Potential pollution outputs: Chemical additive spills, leaks, and fugitive emissions
<b>Mixing</b>	Chemical additive spills, leaks, and fugitive emissions, scrap rubber
<b>Extruding Tread and Side walls-Extruding bead wires- Calendering Rubber/Fabrics</b>	Oil and Grease spills, VOC emissions and particulate, scrap rubber
<b>Cooling</b>	Waste water
<b>Cutting</b>	Scrap rubber
<b>Building</b>	Scrap rubber, VOC emissions (solvent evaporation and adhesives).
<b>Vulcanizing</b>	VOC emissions, carbon dioxide, nitrogen oxides (from energy production "oil, natural gas", and transport), and smell.
<b>Finishing</b>	Scrap rubber and VOC emissions

The pollution outputs from the tyre manufacturing include the outputs shown in Figure 10. There is however an emphasis on VOC emissions which result from cementing and spraying operations and on scrap tyre disposal.

VOC emissions from the rubber tyre manufacturing process are caused by solvent application to the different tyre components before, during and after the building process. VOC emissions also occur in limited amounts from operations where rubber is heated. Such operations include mixing, extruding, calendering, and vulcanizing.

Another large environmental concern with respect to rubber tyres is the disposal of scrap tyres. There are 6500 ton of tyres produced every year. In 1999, the scrap rate from the production at Trelleborg Company was 2.5% of the waste is 200 tons. Scrap tyres in general pose three environmental problems. The first being that tyre piles are a fire hazard and burn with an intense heat which gives off dense black smoke. These fires are extremely difficult to extinguish in part because tyre casings form natural air pockets that supply the oxygen, which feeds the flames. The second threat is that the tyres scrap rainwater, which serves as a nesting ground for various insects like mosquitoes. The third and most important problem associated to scrap tyres is that discarded tyres are bulky, virtually indestructible and when buried tend to work their way back to the surface as casings compressed by the dirt slowly spring back into shape and float the tyre upward (EPA 1995).

At Trelleborg 1, Hazardous waste is 110 ton. Industrial solid waste landfill is 78 ton per year where nothing comes from production. Solid and liquid waste is processed by offsite energy production 374 ton per year. Land-filled waste is accounted to be 680 metric tons in 1999 compared to 447 metric tons in 1998 (Environmental Annual Report 1999). The quality and environmental manger asserts that in 2000, "there are no tyres that go to landfill. Some are sold for burning to create heat. They are sold to companies which separate the rubber and metal ...and the rest is reused."

Hazardous products and chemicals used during the manufacturing processes constitute another threat to the HSE issues in general. According to the HSE Committee BLIC notes that were directed to all rubber manufacturing companies last October (2000), Nitrosamines (anti-oxidant) and aromatic oil are two examples of these matters that need special attention from the rubber companies (BLIC October 18, 2000).

There are other environmental impacts like noise, which considers the mind of the BLIC, and communities. Trelleborg has to follow some regulations as regards noise. They should operate between 7 in the morning and 6 in the evening at 55 db. Thus, the Company has nine check points to make sure that the Company operate with 45 to 52 db at day time and 40-45 db at night time. (Nilsson *Pers.Comm.* September 5, 2000).

As for the noise of the tyres, the Tyre-Testing Manager advanced that there are currently endeavors to adapt some measurement of noise at Pirelli and soon it will be adapted by his service (Lenander *Pers.Comm.* September 25, 2000).

Smoke from curing department is solved by building chimneys (Nilsson *Pers.Comm* September 5, 2000). Note that this is not a solution to the pollution problem, but a way of diverting it since building tall chimneys only makes the pollution get dissipated.

## 2.5 PARAMETERS OF AGRICULTURAL TYRE: ENVIRONMENTAL PRODUCT CHARACTERISTICS AT TRELLEBORG

Agricultural tyres are either radial or diagonal, TWIN or standard ones. They have different features as they relate to their construction, designation, price, and HSE considerations. Here is some environmental product characteristics of TWIN tyres at Trelleborg Company and its outsourcing suppliers' factories. This data is quite important to meet the inquiry of the thesis for it allow the author to determine what are the tyres that are most appropriate to choose as product for environmental labels or declarations. This data also allows the author to compare the environmental product characteristics and records of agricultural tyres at Trelleborg Company to those of the outsourcing suppliers. The aim of this idea is to determine whether Trelleborg is ready to go for environmental labels or declarations and whether it is ready to go one of these tools alone or along with the other suppliers in other countries. A wrap up of these points will be presented in the discussion and conclusion parts of the thesis.

### 2.5.1 CONSTRUCTION AND DESIGNATION

Agricultural tyres are made of: 1) a carcass of textile fibers in shape of a certain number of cord fabric plies to reach desirable strength. 2) belt that is an extra fabric armament on top of the carcass under the actual tread. The belt makes the tread stiffen and protects the carcass from penetration wounds etc. 3) in the tyre bead the fabric plies are anchored to a bead core consisting of numbers of steel wires-depending on which resistance is required. The bead core makes the tyre bead stiff which allows the tyre to be rigid fastening to the rim (the outer part of a wheel to which the tyre is attached). Tread is the large rubber part of the tyre, with the pattern that works directly on the ground, which demands a lot of rubber material especially for grips and durability. And side wall rubber, which covers and protects the carcass side between the tread and the tyre bead. It has *usually* the same rubber material as the tread.

Agricultural tyres have many designations. *Garden tractors* means that the tyre has a special soft ductile (pliable) tubeless construction of nylon. *Forestry special* means that it is a tractor tyre of extra rugged construction. *Agro-Forest tyres* mean that the tyre is intended for rough forest service and has extra heavy tyre side-walls (Victor 1994). *Implement tyres* are used for agriculture purposes (normal construction of nylon) and a carcass made of extra solid rugged construction of nylon or nylon and steel. *Tractor tyres* are used for agricultural (normal construction of polyester) steel belt meaning that they have a belt of steel cord under the tread. *Tubeless* means that the tyre does not have any tube. TWIN type tyres (Agriculture Multi-Purpose Tyre, Forestry, Garden, Implement and Tractor Tyres, Loader, and Light Transport) go from small to big sizes (Victor 1994) (Reuterhall, *Pers.Comm* 2000 ).

Standard Implement tyres (SIT) (*Vicafors*) are low cost tyres used on standard agricultural machines. They are made by the outsourcing suppliers in Romania and Poland. In this respect the Technical Support Manager of Trelleborg Company said: "the standard implement tyres are made in Romania and have still not environmental friendly rubber compounds. A question of price. But we are working on it". The Research and Development Manager added that they are less "environmentally friendly" because they have cheap material on them. This means that Trelleborg Company might use the stick policy (pressure) to make Romania comply by *gradually* by the environmental characteristics of the SIT at Trelleborg Company. It is to note, however, that the SIT produced at Trelleborg have more quality, control and HSE considerations (*Pers.Comm.* October 2, 2000)

Trelleborg name their large wide tyres as *TWIN Tyre* because they normally replace two normal tyres in a double mounting. This results in a larger contact area and that the load is distributed over a larger area, which both good for the tyre and the ground (Victor 1994). TWIN tyres are diagonal but with a belt under the tread. They are large in volume, which allows low pressure on the ground and low compaction of the soil. This explains why Trelleborg has chosen the slogan *Tyre Adapted to Nature* for its TWIN agricultural tyres.

Twin Tractors have polyester in the carcass which avoid the flat spots. However, it is expensive and has more problems in manufacturing regarding adhesion rubber compared to nylon. If the carcass of the tractor tyre is made of nylon, however, the tyre has relatively more durability. Nylon has a shrinkage tendency when the tyre is heated which can cause comfort problems as when parking the vehicle flat spot can occur in the contact area (Lindvall *Pers. Comm* October 2, 2000).

### 2.5.2 CHARACTERISTICS AND BENEFITS OF TWIN TYRES TO THE GROUND

In Sweden an average of 5% is lost as a result of harmful soil compaction. Every year the agriculture loses income of 300-4000 million SEK owing to this fact, advanced one of the professors at Ultuna at the University of Agriculture. The compact structure causes increased ploughing resistance owing to a compact structure. As a result of water logs on the fields, the crops sowed last autumn die and the farmer is forced to sow again, which is also time and resource consuming (more seeds needed for the sowing). It also causes difficulty for the roots to penetrate into the soil, which makes it difficult for the plants to reach the water deeper down. The damage that does not go deep into the ploughing depth is easy to repair, but often the compaction damage reaches a depth of half a meter when the axle load is high. This damage takes time to recover, often as long as a whole generation (Victor 1994).

Suitable combinations of track widths will help to distribute the compaction evenly. When the conditions are dry, a higher compaction is favorable, lower, when the soil is wet. This is due to the plants need for certain proportions of water and air in the ground. When the soil is compacted, the pore volume in the soil is reduced. The coarse pores (common constituent in arable lands in Sweden besides the solid particles) are pressed together. These are important to carry the water away from the ground surface to the drainage system. The exchange of air and carbon oxide at the roots is also made difficult when the pore volume is reduced. The natural structure of the ground is destroyed when it is compacted and the aggregates formed by drought, wet, frost, and biological processes are replaced by the compact structure. When the ground is cultivated the result is hard, sharp edged lumps.

According to Trelleborg Chief Chemist, "TWIN Tyres are *"Adapted to Nature"* because they do not affect the seeds of fields in harvest time and do not break the roots of the trees compared to other tyres. The effect of rut formation has been investigated by the Forest Operations Institute, among others, who found that increased tyre width resulted in higher load carrying capacity for a given degree of rut formation. The increasing width of tyres, low inflation pressures results in lower rut formation, which reduces the rolling resistance and power requirement. For example, for a given load, the wider the tyres the less damage there was to the ground. The increase size of TWIN tyres means that lower inflation pressures (the air pressure inside the tyre) can be used for the same load. Lower inflation pressure means softer tyres, which means better mobility but less ground damage (Victor 1993).

According to article entitled "Reduce Ground Damages with Soft Tyres" and written by the Technical Support Manager of Trelleborg (1991), Forestry machines with TWIN tyres are light on the ground. They are suitable for thinning that is the major method of felling in the continent and accounts for 30 percent of all felling of Sweden. They have good mobility without the need for hard and damaging anti-skid devices. This then is the basis for the development of tyres for forestry use. TWIN tyres a large contact area and relatively low inflation pressure, which gives them good mobility without damaging the ground. Trelleborg has developed a range of forestry tyre sizes and tread patterns. For example, 404 tread has a large number of low profile drive ribs combined with a large shoulder radius, which allows it to be driven over the vegetation mat without tearing it apart. Another example would be that the type patterns like 421/423, 422/424 and 425 provides a better grip in more difficult or slippery conditions, without the need to resort to chains or tracks, which makes the tyres adaptable to different climate conditions. This also make the driver of the tractor or machinery work in comfortable conditions.

This is some to a large extent of the information about TWIN tyres, which shows that the benefits or claims of these tyres are scientifically-based and tested by outsider parties (e.g. university of agriculture) (Victor

1994), which partly comply with the basis of the general ISO 14020 guidelines and general principles.

### 2.5.3 AGRICULTURAL TYRES: MAJOR PRODUCT ENVIRONMENTAL CONCERNS

Labelling programs subscribe to the principle of Pollution Prevention: if a chemical or a material is known to be hazardous, it should be avoided in favor of others, *less* harmful chemicals that fulfill the same function. These are some records of Trelleborg Company in its endeavor to operate within this principle. Comparing the environmental performance of Trelleborg Company to that of the outsourcing is a crucial contribution to the issue at hand, as is it generally depicts what they have achieved so far. Thus, it shows their potential capacity and ability to elaborate environmental labels and declarations. Further elaboration to this point will be tackled in some of Part 4-5.

The parameters tackled below are taken from the criteria document for eco-labelling passenger car tyres to the Nordic Eco-labelling as well as the Swedish Tyre Industry Information Council. The author assumes that the criteria shall include all tyres, but with tailored parameters for agricultural tyres. The author used these parameters for three reasons. First, no third party criteria have been set yet for the agricultural tyres. Only general principles are given (Koen. *Pers.Comm.* September 18, 2000)(Brorson. *Pers.Comm.* October 20, 2000). Second, aspects relating to hazardous substances that mostly come into question to Trelleborg company by the local authorities include the use of certain PHA, solvents, and zinc. Noise, energy consumption and recycling (See Part 2.4) (Detterman November 14, 2000). Third, these parameters constitute some of the major elements that have impacts on the environment. They have been discussed by different rubber industry stakeholders including the BLIC, Swedish Tyre Industry Information Council as well as national and international Non Governmental Organizations (NGOs) (Ecologia Sourced September 23, 2000).

#### **At Trelleborg Company:**

As shown in table 3, All agricultural tyres at the BUFF's contain oil with less than 3% of Polycyclic Aromatic Hydrocarbons (PAH), which are carcinogenic. As regards the oil price, in 1997 the price of PAH oil was 1kr/kg for and 4.5 kr per kg for the environmental sale oil. In 2000, the price of PAH oil is 2.25 kr per kg and 3.10 for the environmental sale in Europe.

In 1997, Trelleborg used 4-5 per hundred rubber Zinc Oxide (ZnO). Currently, Trelleborg uses 3 to 5 parts of Zn O. According to zinc testing three years ago, it was shown that the optimum use of Zn O is 3 phr. Further improvements are carried out by a chemist who (Ann Martens) who attempts to investigate the reduction of zinc use to 1.5-2.5. Strictly speaking, even the ZnO, is harmful to the environment since it one of the chemicals that constitute the fugitive emissions of the life cycle of agricultural tyres. Yet, it is better than Zinc because it is an active substance.

In 1970, Trelleborg used to use Morpholinylmercapto Benzothiazole (MBS) as accelerators, MBS generates Nitroso amine that if decomposed, it will form secondary amine that might cause cancer. In 1989, Trelleborg Company has started to use instead Cyclohexyl benzo thiazole-sulphamide (CBS) that are non-carcinogenic primary amine and Cyclohexyl thiophthalimide (CTP) that is a retardant that is a chemical that slows down the vulcanization process.

As regards antioxidants, Trelleborg use to use Pol.Trimethyl-Dihydroquinoline (TMQ), which is effective and not harmful if one considers HSE issues. Before 1970, Trelleborg used to use Isopropyl-phenyl-p-phenyldiamine (IPPD) as antiozonants, which has allergenic effect like eczema and high emissions for it has a low boiling point that makes it very volatile. Trelleborg then replaced IPPD with Dimethylbutyl-phenyldiamine (6PPD) that is less volatile and less allergenic.

As regards solvents, the Quality and Environmental Manager confirmed that 2kg (1999) of heptane ton was measured per ton of tyre produced. Trelleborg Company cut its of heptane solvent from 140 in 1986 to less than 20 ton per year in 2000. Currently, Trelleborg is using different approaches (material, technology and

process approaches) of clean production strategy to achieve this heptane reduction. For example, it uses tackier compounds (e.g. resin), improves tyre construction to one that needs less solvents and water-based system (CP material approach) to reduce the consumption of heptane solvent in tyre production (building and curing). The Company has also changed the machinery (CP technological approaches) to avoid hand made inaccuracies, as well as it used the CP operation approach which is based on the education of workers to improve efficiency of solvent use especially in big tyres that require some "handmatic" work (Van Berkel 1996). In 2002 the Company intends to increase their production but stays with the use of 20-ton heptane per year. Finally, continuous work is going on to adapt compound raw material to best environmental safety" (Nordström. *Pers. Comm* September 21, 2000).

**Table 3: Records of the major HSE concerns at Trelleborg Company**

HSE Concerns	PAH	Zinc-oxide	Accelerators	Anti-oxidants	Anti-Ozonants	Solvents
Records	Less 3%	3-4phr	CTP & CBS	TMQ	6PPD	20 ton/ year

**In the outsourcing Suppliers**

Oil: On the outsourcing suppliers, the situation is different. Byelorussia switched to producing tyres with oil with PAH less than 3% in 1998 and May 2000 respectively. Romania operates with the scale of 1997 and that is 3.5% of aromatic oil. Trelleborg proposes to Romania to buy more quantities in tank wagon to reduce the price of handling. Romania is compelled to abide by the regulations of Trelleborg otherwise they will loose their business with the parent Company as they are just one of their suppliers. General tyres in the United States (belongs to Continental Germany) is still using oils with more than 3% PAH but the tyres are mainly sold in the American market, and sometimes also Europe at lack of capacity in Trelleborg Company (See Figure 1).

Zinc: Byelorussia use between 3 and 4 parts of ZnO phr zinc. As for Romania (Danubiana), they will be using 3.5 phr for another year.

Accelerators and antioxidants: As in Trelleborg Company, outsourcing suppliers do not use MBS and use CBS (accelerators) in their agricultural tyres and use 6PPD as anti-ozonants.

Solvents: Trelleborg assists the outsourcing suppliers into minimizing the use of solvents (e.g. making compounds tackier/stickier) by continuous communication with and occasional visits to the factories. Strictly speaking, Trelleborg cannot follow up this point as solvents constitute a problem only in the building and curing phases. Once they are transported to the parent Company, they do not bear any stamp of solvents.

**Table 4: Records of the major HSE concerns at the outsourcing suppliers of Trelleborg Company**

Countries	Romania	Byelorussia	USA
<b>Chemicals</b>			
PAH	Not yet	Less 3%	Not fully comply by HSE Considerations
Zinc	3.5phr	3-4 phr	Not fully comply by HSE Considerations
Solvents	Limit use	Limit use	Not fully comply by HSE Considerations
Accelerators & anti-oxidants	MBS, 6PPD	MBS, 6PPD	Not fully comply by HSE Considerations

As regards Srilanka, it is formally not considered as outsourcing supplier because Trelleborg currently owns 100 percent of the factory (Lindvall. *Pers. Comm.* October 2, 2000). Srilanka switched to less 3% of aromatic oil on May 2000. Srilanka uses 3 and 4 phr zinc, uses 6PPD as anti-ozonants and currently gets assistance from Trelleborg to minimize the use of solvents. Trelleborg also tests the raw material Srilanka intends to use in their production of agricultural tyres. For instance, Trelleborg has refused to let Srilanka factory operate with cheap oil procured from one of the oil suppliers. This is because the testing result of oil sample

that was conducted by Interlek Testing Services shows on September 2000 reveals that the oil contains 16% of PAH which is much more than what Srilanka should use (Nordström. *Pers.Comm.* September 21, 2000).

Compared to the records of Trelleborg parent Company, it is easy to deduce lower HSE records of the outsourcing suppliers (Table 3-4). From an environmental perspective, the quality of agricultural tyres supplied is not necessarily the same in United States, as compared to the one marketed in Sweden or Europe. This is partly due to the differences in environmental performance, and different levels of demand and pressure from for "cleaner" agricultural tyres from the other stakeholders of the outsourcing suppliers (Victor.*Pers.Comm.* November 01, 2000). According to the General Manager of Trelleborg Company, this is partly due to the fact that the volume of Trelleborg products is not enough to exert sufficient pressure on the outsourcing suppliers. In terms of its own internal environmental performance, however, Trelleborg has improved drastically from 1970 to 2000 (See Part 2.5.3). Continuous research is conducted to improve these issues (Nordström *Pers.Comm* September , 2000).

### **CHAPTER 3: THEORETICAL FRAMEWORK OF ISO 14020 SERIES**

In the following section, theoretical framework of ISO 14020 series is reviewed with special focus on type I, II and III of environmental labels and declarations. The general principles are presented and the benefits and constrains of each type are identified. Finally, the current situation of environmental labelling in general is discussed to give a general understanding of the stand of each type in respect to current and future (sustainable) considerations.

#### **What Differences does it make for Trelleborg Company to Go for one of the Labelling Types of ISO 14020 Series?**

To answer this question, a comparison was made between the EL. The section below also records the requirements and overview of the benefits and constrains of all three types of ISO 14020 series.

#### **3.1 ISO DEVELOPMENT**

ISO is an international federation which itself comprises the governmental and non-governmental technical standard associations of 118 countries dominated by representatives of industry from the developed world. In Sweden, ISO has good reputation of many stakeholders (Swedish Standardization November 10, 2000). Traditionally, its initial activity was to facilitate trade through the development of voluntary standards. ISO efforts were first directed to the promotion of technical standards in some fields like photography and chemicals. In the 1980's, ISO expanded its international standardization activities beyond strictly technical issues with the development of its ISO 9000 quality management standards. In 1991, ISO began work on the ISO 14000 environmental management series such as the 14001 Environmental Management System (EMS), 14040 Life Cycle Analysis (LCA), and 14020 environmental labelling and declarations (FAO Sourced September 1998). In mandatory government programs (e.g. US EPA Pesticide Labelling Programme), labels may also convey "negative" information about a product in order to encourage consumers to reduce consumption of such products or choose other products of the same category causing less environmental harm (Davis 1998).

#### **3.2 OVERVIEW OF ISO 14020 SERIES: BENEFITS AND CONSTRAINS**

##### **3.2.1 ISO 14020- ENVIRONMENTAL LABELS AND DECLARATIONS - GENERAL PRINCIPLES**

This International Standard sets guiding principles for the development and use of environmental labels and declarations. All the other international standards in the series are designated to be consistent with the principles set forth in this Standard. Other standards currently in the ISO 14020 series are ISO 14021, ISO 14024 and ISO/Technical Report (TR) 14025.

#### **Description of ISO 14020 Principles**

All of these principles are applicable to all environmental labels and declarations. These are their statements and some specific conditions (ISO 14020 1998) (Kuhre 1997)

**Principle 1:** EL shall be accurate, verifiable, relevant and not misleading. Their usefulness and effectiveness depend upon the extent to which they convey reliable and meaningful information about the environmental aspects of a product or service. EL shall be accurate information about the environmental aspects of a product or service. The "factual" and technical basis for EL shall be verifiable. EL shall give information that is relevant; they shall address only important environmental aspects related to the current circumstances of natural resources extraction, raw material procurement, manufacture, distribution, use or disposal associated with the product or service. A periodic review of the basis for EL should occur to account for innovation. EL shall be understandable and not likely to mislead the purchaser of the product or service.

**Principle 2:** Procedures and requirements for EL shall not be prepared, adopted, or applied with a view to, or with the effect of, creating unnecessary obstacles trade. For guidance on the above principle, the applicable provisions and interpretations of the World Trade Organization should be taken into account.

**Principle 3:** EL shall be based on scientific methodology that is thorough and comprehensive to support the claim and that result that are accurate and reproducible. The information-supporting EL shall be collected and evaluated, using appropriate and recognized methods that are generally accepted in scientific or professional disciplines. The methods shall provide information that is relevant and necessary to support the claim as well as consistent and accurate. The methods should follow recognized standards that have international acceptability (these may include international regional or national standards "e.g. SIS") or industry or trade methods, which have been subjected to peer review, where such standards or methods exist.

**Principle 4:** Information concerning the procedure, methodology, and any criteria used to support EL shall be available and provided upon request to all interested parties. The information shall include principles, assumptions and boundary conditions. This information should be sufficient and reasonably comprehensive to allow purchasers, potential purchasers and other interested parties to evaluate and compare EL in terms of scientific principles, relevance and general validity, and to assess whether an environmental label or declaration is consistent with the applicable standards within the ISO 14020 series. This information shall clearly point out whether the environmental label or declaration is a self declared environmental claim or is based on independent validation.

**Principle 5:** The development of EL shall take into consideration all relevant aspects of the life cycle of the product. The life cycle of a product or service ranges from activities with the production and delivery of raw materials or generation of natural resources to the final disposal. The life cycle of a product or service allows a party to develop an EL taking into account a range of factors that impact on the environment in order to help identify appropriate and relevant characteristics and criteria for EL or to determine the significance of an environment claim. The extent to which the life cycle is considered may vary depending on the type of environmental label or declaration, the nature of the claim and the product category.

**Principle 6:** EL shall not limit innovation, which maintains or has the potential to improve environmental performance. Prescriptive design criteria or implicit preference for a technology should be avoided. Requirements shall be expressed in terms of performance rather than design or descriptive characteristics. This approach leaves maximum flexibility for technical or other innovation.

**Principle 7:** Administrative requirements or information demands related to EL shall be limited to those necessary to establish conformance with applicable criteria and standards of the labels and declarations. All organizations, regardless of size, should have the same opportunity to use environmental labels and declarations. Involvement should not be hindered by external factors or requirements such as procedural complexity or unreasonable information or administrative demands.

**Principle 8:** The process of developing EL should include open, participatory with interested parties. Consistent efforts should be made to achieve a consensus throughout the process. The process for developing standards and criteria shall be open to all interested parties. The parties shall be invited to participate and encouraged to become involved through timely and adequate notification. Parties may choose to participate directly or through other means such as written or electronic notification. Comments and input shall be responded to in a meaningful way that addresses the substance of the comment or input.

**Principle 9:** Information on the environmental aspects of products and services relevant to an environmental label or declaration shall be available to purchasers and potential purchasers from the Company or organization party making the environmental label or declaration. The efficiency of EL depends on their ability to enable purchasers and potential purchasers to take responsibility for, and make informed choices about, the environmental aspects of their purchasing decisions. This, in turn, is related to the degree of acceptance and understanding purchasers have of the information provided about environmental aspects. Therefore, parties using EL have an inducement and a responsibility to provide their purchasers and potential purchasers with access to information so that the purchaser and potential purchaser may understand the meaning of any claim, symbol or term. These principles are brought up in this point because they are important to the general framework and basis of all types of ISO 14020 series (ISO 14020 1999) (Kuhre 1997).

### **3.2.2 ISO 14021: ENVIRONMENTAL LABELS AND DECLARATIONS - SELF-DECLARED ENVIRONMENTAL CLAIMS (TYPE II ENVIRONMENTAL LABELLING)**

This International Standard specifies requirements for self-declared environmental claims, including symbols, regarding products. It further describes selected terms most used in environmental claims. This standard also describes a general evaluation and verification methodology for self-declared environmental claims and specific evaluation and verification methods for the selected claims in this standard. The standard does not override legally required environmental information, claims or labelling, or any other applicable legal requirements.

Self-declarations are currently used by some industries. Industrial sectors such as information technology, textiles, building material and printing paper in Sweden have initiated Type II product declarations. Examples include claims like "made from x% recycled material". Self-declarations shall include positive and/or negative indicators about the product. They could be developed to inform the customer about the "environmental friendliness of the product". The environmental friendliness is measured by the international indicators and tools set by international standard organizations such as The European Tyre and Rim Technical Organization (ETRO), Swedish Institute for Standards (SIS), ISO and others.

According to the experts who participated in the Brussels workshops of the European Commission as regards the issue of IPP (1998), product declarations aim at facilitating the distribution of environmental information "business to business" for they are considered as complicated information for private customers. It should be up to the business community to take responsibility for its products in the first place because non-verified information on the other hand may still be a problem, from a credibility and quality point of view.

#### **3.2.2.1 BENEFITS OF SELF-DECLARATIONS: ISO TYPE II**

ISO requirements for self-declarations are voluntary but the market force companies and other stakeholders have started to give interest to it (FAO Sourced September 1998). Self-declarations are cheaper and the time-to-market shorter compared to both Environmental Product Declarations (EPDs) and eco-labels (Granda et al. 1998). They are important in the sense that they can constitute one of the opportunities (in the short term) for companies to help procurers make their choice about products. By developing transparent, scientific and reliable self-declarations, companies shall cease the opportunity to build up trust between the

companies and the procurers. They are also a tool for companies, which have unequal environmental performance in the countries of their outsourcing suppliers and still have to respond the demand and needs of the local stakeholders.

### 3.2.2.2 CONSTRAINS OF SELF-DECLARATIONS: ISO TYPE II

**Credibility Issue:** For the manufacturing Company, a problem related to self-declarations, is the credibility gap between the producers environmental performance of their products and the consumer's, or the customer's, trust in the producers (Rafecas and Escute 1997). The local authorities do not trust enough the producers and ask the middlemen (the tyre dealers) to show them some kind of certificate of the environmental friendliness of the proposed products. This is due to the fact that the local authorities are aware of the pollution aspects companies generate in their production processes. Besides, the local authorities operate with the strategic regulations that push local regulators to exert indirect pressure on companies by choosing the product that affects the least the health, safety and environment. However, bridging this credibility gap through using Type I eco-labelling implies placing a Company external label "between the brand label and the customer", which producers might find disadvantageous from a marketing perspective " (Johansson 1999).

**Self-Declaration Requirements:** Self-declarations require the minimum from marketers or companies and cannot be assessed by a third party. The production of self-declarations put few restrictions on the marketer, and might create confusion and lack of confidence to the consumer. For there are not set guidelines to follow while producing this type of declaration. This is supported by what has been advanced by Dirksen et al. at Hewlett-Packard in their paper on eco-labels versus self-declarations (1997):

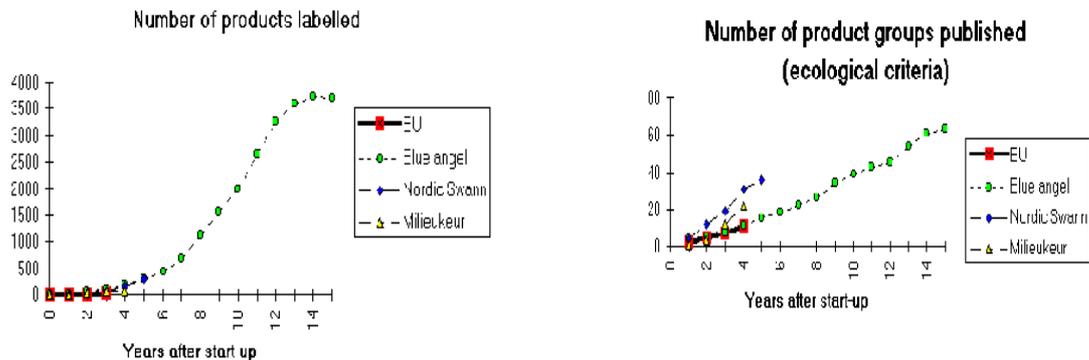
"Credibility problems due to lack of third party testing; The lower user- friendliness as compared to eco-labels; and no determined thresholds of acceptable levels".

Provided that there is no innovation in producing self-declarations, they might create non-labelling/declarations in the long term (See causal loop diagram-Scenario 1).

### 3.2.3 ISO 14024: ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE I ENVIRONMENTAL LABELLING - PRINCIPLES AND PROCEDURES

This International Standard contains guiding principles and practices, criteria procedures and guidance for certification procedures for the development of multiple criteria-based, third party environmental labelling programs (Type I). This standard aims at reducing environmental burden by promoting market-driven demand for and supply of product meeting a single or multiple-criteria based environmental labelling program, verified by a third party. The awarding body may be either a governmental organization or a private non-commercial entity. Examples include the EU Eco-label, and the Nordic Swan, and the German label called the Blue Angel. According to the Global Eco-labelling Network (2000), eco-labelling is a guide for consumers to choose products and services that cause less damage to the environment, in production, consumption and/or disposal. Eco-labelling is different from the setting of minimum product standards or requirements. The difference is that eco-labelling is intended to reward environmental leadership.

**3.2.3.1 ECO-LABELLING DEVELOPMENT OF OTHER PRODUCTS IN EUROPE**



**Figure 11 and 12 : The number of product labeled and published in Europe**  
 Source: European Commission, 1996

Figure 11 and 12 show the development that all eco-label schemes have undergone throughout time. As a comment on Figure 11-12, the author is aware of the fact that the figure dates back to 1996 but it was by purpose to trace the history of the development of the eco-labelling at its very beginning. This can also be said about the development of car tyre passengers and agricultural tyres in the long run if there is more market and legislative demands for it.

**3.2.3.2 ECO-LABELLING: BENEFITS TO STAKEHOLDERS OF SOCIETY**

**What Are the Benefits to Consumers?** Eco-labels shall play an informative role to the consumers. Rubik (1995) contends that in all the purchasing decisions consumers are faced with a limited capacity for information processing, added to an information overload. This leads to consumers choosing what Rubik would conceptualize as information chunks: very condensed information outputs in the form of producer image, brand names and labels. They become more important the lower the cognitive control of the purchasing power and as it becomes more difficult to assess the product. This is where eco-labelling comes in as independent and reliable chunk condensing environmental information to the consumer. Considering Nordic countries, there has been a substantial recognition among consumers who were affected by the Nordic Swan and the Swedish Good Environmental Choice (GEC), e.g. impact of GEC on purchasing decisions of Swedish detergents (OECD 1997). There are different ways for assessing the effects of eco-labelling programs. This might include surveys analyzing the degree of recognition on the marketplace or asking customers if they take eco-labelling into account in purchasing decisions. Obtaining sales figures for products that are labeled/not labeled from the producers/retailers might be more difficult, due to confidentiality reasons. However, it is also more difficult to separate out market effects created by eco-labels and effects arising as results of other factors.

**Influence on Producer Behavior:** The role of eco-labelling then is a possibility to bridge the gap between the producers environmental performance of their products and the consumer's or the customer trust in the producers as was argued by Rafecas and Escute (1997). Eco-labelling shall also encourage the producers to makes changes in the production methods and the product content. However, some people would argue that this might happen even in the absence of eco-labelling, as producers are currently keen to take credit for actual improvement from other stakeholders.

**The Benefit of Eco-Labelling to the Environment:** Producer actions shall constitute improvements to the environment that is voiced by eco-labelling programs. One way to assess the benefits of eco-labelling to the environment would be to indirectly measure the consumer awareness, consumer demands for eco-labels and changes in product behavior. The German Federal Environmental Agency asked 293 companies that used

the eco-label for their views on the benefits of the label to the environment. Of 293 companies, 56% believed the advantages of the eco-label to the environment to be high or very high (Umweltbundesamt 1998).

### 3.2.3.3 CONSTRAINS OF ECO-LABELLING: ISO TYPE I

Before talking about the impediments, one should consider the difference between general and specific impediments. The author calls "general or strategic" impediments for the problems that are inherent to the international standardization. And, calls "specific" the problems that are specific to the rubber industry, stakeholders, Company or product group.

**Trade and Socio-Economic Barriers:** Eco-labelling programs can act as trade barriers for imported goods if the product criteria relate to production stages (EPA December 1998). Foreign producers believe that eco-labelling (and LCA) tends to impose the environmental concerns of the importing country on the exporting one. Consequently, this criticism charge eco-labels favor domestic products because environmental criteria used to award an eco-label are aimed at protecting the environment of the domestic market and do not take into account the environment conditions of the exporting nation. For example, many paper producers in the United States and Brazil were critical of the EU's strict PPM based criteria on effluent and emission limits of sulfur dioxide emissions. Many of the criticism objects to the fact that the criteria could not be met by foreign producers and that they were designed to favor domestic producers (Cadwell 2000).

In some cases foreign producers are operating under environmental, regulatory and economic/industrial conditions significantly different from those prevailing within the EU. Under these conditions, it is often difficult to set a uniform community-wide eco-label criteria, which is applicable to foreign producers without introducing undue discrimination. And be able to achieve a sufficient level of eco-labeled products in all member states, while preserving the credibility of the community eco-label to consumers also in the most environmentally advanced community countries. On 24 September 2000, the European Parliament has *just* completed the revision of the Community eco-label scheme where they entered into force some regulations in favor of the developing countries and the SMEs . The benefit was a reduction in the general fees for these two parties by at least 25%) (SIS Eco-labelling 2000). However, it is still premature to assess the accuracy and outcome of such initiative.

Harmonization of some issues such as cultural norms and values used in prioritization and trade off analyses among other attributes may impede a mutual recognition of award criteria in particular categories. According to the Spanish competent representative of Eco-labelling in Europe:

"Eco-labelling systems have to consider not only cultural differences but also environmental and product use differences. So, when setting ecological criteria you have to consider the scope of the system. A national scheme can be more specific and take account of these particularities. EU schemes are more visible but less specific. Thus, sometimes, it is difficult to reach an agreement among countries with different environmental situation and different consumer habits. If this occur in Europe the situation in developing countries will be more critical."

**Financial Considerations:** For manufacturing companies, problems related to eco-labelling, are the costs for applying the labels especially if the producer sells his product on several different markets, time consumed in labelling process, and the product development process becomes tied to the parameters listed in eco-labelling criteria (Elejabeitia. *Pers.Comm.* September 14, 2000).

**Differences in Environmental Preferences:** In rubber industry, international producers do not only have larger financial resources, to spend on eco-labelling, but they also have larger product series on which to spread the costs. Within the domestic producers, a slight preeminence should be made between large and small producers. Small producers are difficult to influence for they do not the financial resources and the organizational potential. Yet, eco-labelling impact might or might not influence customers purchasing

decisions because it is linked to external factors such as the level of awareness of society, and customers, and the degree of environmental regulatory pressure on the producers. That is to say that the impact of labelling issues is context dependent. For example, Trelleborg outsourcing suppliers in United States (e.g. uses PAH oil) and Italy, Romania, Poland and Byelorussia are not generally influenced by the labelling issue. This is due to the fact they have no or not sufficient pressures from other customers given the low interest to and profile of environmental issues in these countries. This eventually constitutes a hindrance for Trelleborg Company in Sweden to make general claims or declarations about its agricultural tyres or TWIN tyres, since they are marketed not only in Sweden but also in Europe and some other parts of the world as well.

**Eco-Labelling Design:** Critique has been voiced that in the design of third party eco-labelling either government, various segments of the industry or environmental interest groups have not had sufficient opportunity to express their respective interests (Dorken. *Pers.Comm.* October 6, 2000). As a consequence, accusations have been made regarding the independence of the initiators of such schemes from vested interests, be they governments, industry or environmental NGOs (FAO Sourced September 1998). ISO Type I needs consensus at every step of every development of product criteria. This is theoretically good but it can block the consensus and halt the product development (Cadwell 2000).

An argument against eco-labels, and in favor of self-declarations is the claimed effect of environmental improvements being restricted to the requirements postulated in the criteria, and the loss of incentive to improve other aspects of a product (Dirksen et al 1997). This selectivity has made of it a "Pass-fail" tool (Boustead 1999) that parties (e.g. BLIC) are reluctant to choose as a product policy in the short term. Another argument against eco-labels is related to its selective nature. Eco-label criteria are established in such a way that only a number of products on the market can qualify for the label. This approach introduces competition between manufacturers on the ground of the environment. Individual companies seeking competitive advantage may well be interested in the eco-label. However, many associations which are bound to represent the interests of the whole or at least the majority of their members, do not favor this approach one of which is the trade associations (e.g. BLIC) (Dorken. *Pers.Comm.* October 6, 2000) This is in turn to the fact that there is no guidance given at present in the regulations on how to establish the selectivity level of third party eco-label criteria for tyres as product category. This has led to great difficulties, in particular when trying to reconcile divergent points of view between member states where product technology and market structures are substantially different. Certain member states tend to interpret the eco-label as a sign of excellence (e.g. Italy), whereas others are more interested in less narrow participation in the scheme and its overall potential for promoting improvements (e.g. Germany, Denmark)(FAO Sourced September 1998) (Mistry, Ogilvie 2000) (Cinaralp 2000).

**Eco-Labelling: Long Term Considerations:** Eco-labelling is, from the producer perspective a way of keeping competitive value. Examples of this have been numerous times in different markets. One example is detergents on the Swedish market, where it is commonly known that certifying products for either of the type I eco-labelling programs has become a prerequisite to stay on the market. Another example is when an American paper producer became the first to have their products certified for the Blue Angel label in Germany, a number of domestic German producers quickly followed their example (Davis 1998). This probably might lead to non-labelling of products in the long term. This is reflected in the causal loop diagram Figure 4 (Scenario 2) and supported by Rafecas and Escute (1997) who said:

"Certifying products for an eco-label might create a temporary advantage. One that vanishes, however, when other producers respond by also labelling their products. When this happens, they conclude, the advantage of labelling products changes to a disadvantage in not labelling products. This is an effect of eco-labels becoming an integral product characteristic in the eyes of the consumers".

### 3.2.4 ISO/TR14025: ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III ENVIRONMENTAL DECLARATIONS

The Technical Report ISO/TR 14025 identifies and describes elements and issues concerning Type III environmental declarations and corresponding programs, including technical considerations, declaration

format and, and administrative considerations for developing and/or issuing a Type III environmental declaration. These claims consist of quantified product information based on life cycle impacts. The Technical Report is to be reviewed within three years after publication, in order to see whether ISO should proceed and agree on making it a standard, abandon it or change it (Jönsson November 14, 2000) (ISO 14020 1999).

There is an increasing demand on the market for LCA-based, quantified information about environmental performance of products and services, so-called Type III environmental declarations. The EPD system is a system for LCA based and environmental information open for all products and services to support continuous improvements based on in-Company product development process. It usually requires some environmentally related parameters such as the environmental policy, EMS, environmental reporting and compliance by marketing legislation regarding environmental marketing. The EPD's are revised annually to include the new product developments and environmental research. Such information is needed in several market places. In supply chain (e.g. in the raw material supply-chain) as well as green procurement, a growing number of parties are requesting environmental declarations of contents of products and what type of environmental impacts they cause in life cycle perspective (Swedish Environmental Management Council Sourced October 20, 2000).

One of the important properties of a certified environmental product declaration is that it provides comparability between declarations within a given product group or service type. To get this, the basic data must be calculated in the same way and with the same general rules such as the different forms of assumptions as well as the setting of system boundaries and the choices of calculation methods. However, specific parts in a certified environmental product declaration may differ somewhat for selected product groups and service types, due to the variations in their environmental properties. Therefore, different product-specific requirements (PSR) may have to be prepared from case to case. This is principally a task for a manufacturer, importer, industrial organization etc, which has good knowledge of the specific environmental properties related to a certain product or service (Swedish Environmental Management Council Sourced October 20, 2000).

One Explanation of LCA is that is an assessment of the environmental impacts of product's life cycle that is made of the activities that go throughout the life cycle of the product (See Part 2.4). It shall includes stages ranging from "cradle" raw material extraction, through fabrication, manufacturing, packaging, transportation, consumption, and recycling, to the grave (disposal and re-use). LCA has expanded among companies and organizations as preventive and strategic environmental work. It shall be used to meet purposes such as (Brorson *Pers.Comm.* October 20, 2000) (James (ed.) 2000):

- In product development work: to identify opportunities to improve the products and services at various points of their cycle and identify areas where you should put focus in product development
- In environmental management work: as an approach to identify the environmental aspects and help setting targets and objectives within the framework of environmental management system.
- In communication and marketing: giving a holistic view to how describe environmental product performance.

According to the representative of the Spanish competent bodies Anton Elejabeitia:

"The use of LCA is very ambiguous. Standards talk about LCA "considerations" and considerations can mean what you want. The general idea is to consider the all life cycle when assessing a product but not necessary carry a complete LCA. There are three approaches: LCA thinking; its a qualitative study of the products life. Not necessary including all steps of the methodology and focusing on life cycle steps a priori you consider more important. LCA simplified. It is a streamline study. You follow the methodology (ISO 14040 series) but you simplified some parts (phases like transport, or data on inventory) without affecting the result of the study. Complete LCA. Study in conformity with ISO 14040 with all phases. The reality is that almost all the LCA are in one way or another simplified. A complete LCA is very expensive and takes a lot of time"

To comment on this interview, LCA shall be simple. However, it seems that it is disadvantageous

anyway no matter how it is done, which might make companies think that it is not worth putting money in it.

#### 3.2.4.1 BENEFITS OF ISO TYPE III: TECHNICAL REPORT (LCA)

**Miscellaneous:** Why is the life cycle concept relevant to the environment? The environmental problems associated with a given product can be traced back to the inputs that go into the product (land, materials, water, energy), and the outputs generated (e.g., air emissions, liquid effluents, solid wastes), at each stage in the life cycle. LCA also increases believability through third party verification to companies which do not have credibility and/or which are keen to make their brand image known and credible especially for companies with small shares in the market. Unlike Type I and II, ISO type III gives a detailed, objective and neutral environmental information about the product, to the customer. LCA helps companies point out where most the leaks and pollution outputs come from and thus try to deal with these problems.

#### 3.2.4.2 CONSTRAINS OF ISO TYPE III: TECHNICAL REPORT (LCA)

**Miscellaneous:** There are many inherent problems in LCA. LCA favors more products and means of production, which might create trade barriers instead of reducing them. Properties such as biodiversity and aesthetics cannot be quantified and so do not appear in the final result table of the LCA (Boustead 1999). There is a lack of consensus on LCA methodology. Thus, it is always possible to challenge the assumptions, which underlie the analysis LCA is hard to determine the boundaries of each stage and their impacts (Kuhre 1997). LCA gives complex information that is *difficult* to compare *different companies* on its basis as well as to interpret and use. EPD's in this case are more probably to convey environmental performance to the knowledge managers and professional procurers, which might push customers to either over-value the meaning of the EPD (Palm and Windahl 1998). Finally, such analyses are extensive, time consuming and require information about processes that is not readily, if at all, available (EPA December 1998) (Brorson *Pers.Comm* October 20, 2000). Further elaboration and discussion of the EL will be presented in the following sections.

All EL have general inherent problems. Overall, there has been a lack of overall direction and coordination concerning the labelling progress, which has created confusion to stakeholders. Thus, many countries do not recognize labels, understand details of labelling programs, or have any strategy regarding the issue of labelling (Kuhre 1997).

## CHAPTER 4: RESULTS AND FINDINGS

This chapter presents and examines the results and findings of the data presented in the previous sections as well as the results of the SWOT analysis, the communication channels (e-mails, interviews, and questionnaires) and the causal loop diagrams. This section ultimately aims at giving a closer examination to the issue of environmental labelling in general to both the Trelleborg Company and its stakeholders, and understanding the strategic environment where the Company operates or wants to produce its environmental labels and/or declarations. The findings are examined in terms of the demands, needs and ability of the Company, which is a way to examine the possibilities and constrains of going for environmental labelling of agricultural tyres.

### 4.1 HSE ANALYSIS OF AGRICULTURAL TYRES

Based on SWOT data which shows that "market depression in agricultural market is coming to an end", this explains that the Company should currently give more value to the agricultural tyres given the expected increase in the market of agricultural products (tyres in this case). The increase in the demand of products would make suppliers (competitors) produce more and make the customers more demanding in their procurement decisions. One way of product assessment is that customers would ask the tyre manufacturing

companies to show them if the agricultural tyres have certificate eco-labelling or declarations saying that the product is manufactured in "an environmental manner".

A quick analysis of Trelleborg agricultural tyres depicts that Trelleborg Company operates within the framework of some preventive strategies (Clean Production). This is mainly shown in the use of "material and technological approaches": e.g. less procurement and use of dangerous material and chemicals and better technologies and management for solvents (R.Jönsson. *Pers.Comm.* September 19, 2000). Based on Part 2.5.3, the author dares to say that the achieved records of agricultural tyres at Trelleborg Company do not *all* live up to *all* the requirements of local regulators. Thus, if Trelleborg wants to only go for EL of TWIN tyres, they have better environmental records to convey to its stakeholders, as compared to their records of standard tyres. The environmental quality of agricultural tyres in the outsourcing suppliers, however, is still relatively inconsistent to those of Trelleborg Company in Sweden. The outsourcing suppliers are still not working in parallel with Trelleborg parent Company as their environment is less demanding to the HSE criteria compared to Sweden (Table 4). Thus, Trelleborg needs to strengthen its endeavors in meeting the local demand and needs to enhance the environmental management of its suppliers in other countries, as it is part of the Producer Extended Responsibility.

#### 4.2 POSSIBILITIES TO IMPLEMENT ISO 14020 SERIES IN AGRICULTURAL TYRES AT TRELLEBORG COMPANY

To investigate the possibilities of labelling the agricultural tyres, the author attempts to answer the following questions:

- 1) *Why should Trelleborg be interested in Integrating ISO 14020 Series in its Company?*
- 2) *What role does eco-labelling play for tyre manufacturing companies?*
- 3) *What are the effects of self-declarations on customers: can Trelleborg learn from the experience of other companies?*
- 4) *What about Life cycle analysis at Trelleborg Company?*

##### 4.2.1 WHY SHOULD TRELLEBORG BE INTERESTED IN INTEGRATING ISO 14020 SERIES IN ITS COMPANY?

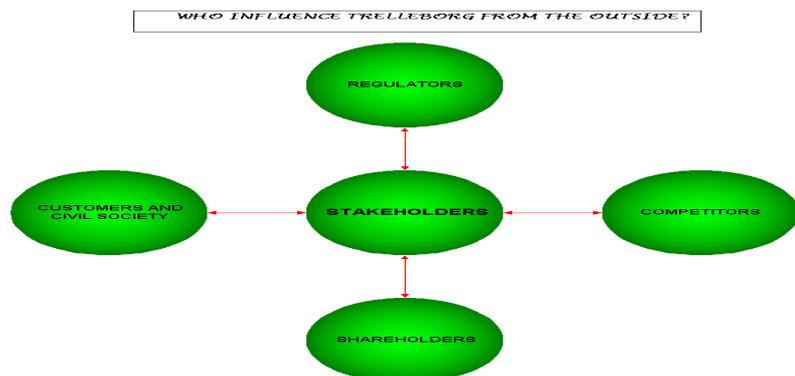
The objective of the thesis is *also* to investigate the potential actors who could influence the issue of ISO 14020 series and thus talking about the perspective of the following stakeholders is of interest. In this regard, interviews were conducted with Trelleborg officers and questionnaire, e-mails and/or phone calls were sent to Trelleborg competitors to aggregate their opinion towards the 14020 series issue before going into the criteria development.

##### Let's Get to Know the Opinion of Our Stakeholders?

In the light of the interviews the author has made with Trelleborg officers (Victor, Schylit and Brorson), the stakeholders including the European bodies of eco-labelling, the competitors, regulators, academics and consumer organizations, Trelleborg is interested in the series because of many factors. They can be summarized as follows:

**Figure 13: The main stakeholders for the implementation of ISO 14020 Series within Trelleborg Company**

1 The EL issue is becoming more appealing especially to the European and Swedish customers; in the case of Trelleborg Company, local authorities are very strict in their procurement. They request a certification from the tyre dealers that show that Trelleborg Company

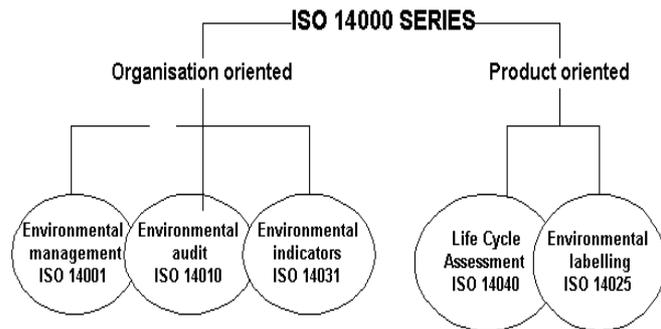


- 2 products consider some HSE issues (Victor *Pers.Comm* September 2000).
- 2 Competitors are giving more weight to the issue of environmental performance (Lindvall, Shylit, Brorson *Pers.Comm* 2000). This attracts customers, and could affect positively their product and production HSE performance, Then, ultimately add value and market their products and satisfy their shareholders, the corporate managers for decision making.
- 3 Regulatory requirements (EU policies, governmental guidelines (EPA), and standard organization as well as government procurement play an influential role to push companies produce clean products (EPA 1998).

**Figure 14: ISO 14000 Environmental Management Standards.**

Source: Brorson and Larson, 1999

- 4 Trelleborg knows that international organization for standardization ISO 14000 series covers two groups of standards that are both product and organization and oriented. The efficiency of the implementation of ISO 14000 is not only related to the adoption of ISO 14001 (EMS), which is organization oriented but also to product oriented instruments like ISO 14020 series. Thus, the investigation of the labelling issue is of interest to their overall environmental performance (Brorson, Larson 1999) (Leubuscher et al 1998).



According to the causal loop (Figure 2), the main driving force of labelling agricultural tyres is the increase in demand for green products by the stakeholders of the Company. The stakeholders involve the regulators, consumer organizations, tyre dealers, the local authorities and institutions, local communities and the environmental performance of competitors (e.g. Goodyear). In terms of the current needs of the Company, the most important actor or stakeholder is the tyre dealer (procurer and suppliers of tyres to local authorities) for they demand a kind of "certificate" or "declaration" that shows that the tyres Trelleborg Company is producing are "environmentally friendly" (Victor 2000).

These findings show that the Swedish government plays an important role in defining the environmental related policy to stimulate development of environmentally sound products. The findings also mean that public procurement is an important market based institution, which increases the development of environmental adapted products. Thus, procurement policies can be considered as a "compelling" driving force for Trelleborg Company to adapt its product (tyres) to the guidelines of the Swedish guidelines and practice as regards the "environmentally sound procurement that was introduced by Sweden in 1998 (Torissen 1998).

These procurement policies that Trelleborg "feels" while dealing indirectly with tyre dealers also stems out from their "Extended Producer Responsibility"(EPR) that was introduced in Sweden in 1994, and which dictates certain practice and performance vis-à-vis the Company (European Commission 1998) (Trelleborg Environmental Annual Report 1998) (Lee, Stensel 2000). This is supported by the Nordic countries position that was articulated in the European Commission Workshop in Brussels as regards Integrated Product Policy, confirming that environmentally sound procurement is very important tool to influence the patterns of consumption as well as production (Torrisen 1998).

The two findings: local procurement pressure and the increasing interest of competitors to improve their product, stimulates Trelleborg interest in EL. The author contends that these findings if they are to persist, they would lead to the maturation of the environmental policy and performance of the company as a whole, which would lead to a continuous search for tools of environmental adapted products (See causal loop 3).

Accordingly, environmental policies in Sweden can be viewed as source oriented (regulating enterprises), substance oriented (regulating the use of chemicals) and/or media oriented (e.g. workshops and publicity). In this case study, the Swedish policy seems to be especially "indirect source oriented" and "indirect substance oriented". This means that the local authorities directly impose procurement policies on the tyre dealers, which indirectly influence the procurement policies of Trelleborg. This is mainly because Trelleborg would fear to lose its market if it does not meet the needs of the tyre dealers and local authorities. This is due to the fact that tyre dealers have a large variety of suppliers and thus have the power of the "stick" vis-à-vis the tyre manufacturers in general. (European Commission 1998).

Based on figure 13, the competitors of Trelleborg Company constitute another actor that come at play when dealing with ISO 14020 series. The author was able to get the feedback of all the contacted companies (Alliance, Goodyear, Firestone, Nokian Tyres, Michelin, and Continental) as regards ISO 14020 series. Taurus Rubber Company Ltd, and Vredestein Banden B.V were the only companies which were unreachable and did not to respond to the author's query. The result of the questionnaires, e-mails and/ or phone calls, reveal that all contacted companies do not have any information about the current progress of labelling issue when they have been asked to give their opinion about the EL issue. All of Firestone, Nokian Tyres, Michelin, Alliance, and Continental confirm that they do not know anything about what the other companies are doing in terms of the labelling issue. These companies (except Alliance) asserted to generally know about eco-labelling issue and ISO 14020 series. However, they advanced that they do not know about self-declarations, as one of the types of ISO 14020 series.

These responses might have many explanations. 1) Considering the Environmental Economics term of Polluter Pay Principle (PPP), which stresses the fact that polluters should pay for their pollution, EL, generally perceived as voluntary actions, do not force polluting companies to pay, in this case to produce these voluntary declarations (carrot /voluntary policies). 2) There has been a lack of overall direction and coordination concerning the labelling progress, which has created confusion to stakeholders. Thus, many countries (companies in this case) do not recognize labels, understand details of labelling programs, or have any strategy regarding the issue of labelling (Kuhre 1997).

Goodyear, however is the only company among the interviewed ones, which has produced self-declarations to their products. For sake of clarity, the product-declarations that they have developed consist of a brochure presenting environmental information about *all* their tyres produced in Sweden such as tyre retreading, brand name, content of tyres (use of PAH, Zinc Oxide), noise level according the EU regulations, and the ISO certification they got. (ISO 9000, 14001 and QS 9000) (Detterman. *Pers.Comm* November 14, 2000). However, strikingly enough, Goodyear does not know anything about ISO 14020 series. The self-declarations the Company has developed are based on the environmental questions they have got indirectly from the tyre dealers' customer. The Manager for Sales and Technical Support at Goodyear, Sweden who was in charge of developing the environmental declarations advanced: " the environmental declarations we have developed do not have any connection to ISO 14020 series. They are declarations directed to the purchasers who ask for this kind of information". Further discussion of this point will be elaborated in Part 5.2.4.

#### **4.2.2 WHAT ROLE DOES ECO-LABELLING PLAY FOR TYRE MANUFACTURING COMPANIES?**

Regarding the issue of eco-labelling, according to a competent member of the Spanish body for eco-labelling in Europe; there is a feasibility study for EU Eco-scheme tyre requirements in general, but there are no specific criteria, set for agricultural tyres. Like the remark that Daniel Johansson (1999) has brought up in his master thesis when he was examining the influence of eco-labelling on producers of personal computers, the author of this thesis also states that it is "...Difficult to obtain hard facts on the influence of eco-labelling and to exactly assess its effects. This comes from the lack of reference points, that is, what would the situation have been like without the eco-labels..."

Given the financial constrains of opting for Type I (See Part 3.2.3.3), an important point needs to be

considered in this section and that is what is more appropriate hypothetically for Trelleborg to go for: Nordic eco-labels or European eco-schemes? As Trelleborg Company's biggest market is in Sweden and Europe and the rest of the world (emerging markets) respectively, the author sees that talking about the EU scheme and the Swedish SWAN is of use to this context. It is true that the Blue Angel has many successful stories (e.g. tissue paper. The total number of labelled products is about 4000 products in 2000). It is recognized by the Germans and some other international countries (UK, USA etc). However, it makes more sense for tyre manufacturing companies to choose their local label if it is also of equal good reputation.

Based on Figure 11 and 12 that show the general European development of eco-labelling, it is quite interesting to note that all eco-label schemes have undergone similar developments with procedural and methodological problems in their early stages of life (European Commission 1996). This statement is supported by the Spanish and Dutch competent bodies as well as the representative of the Rubber Manufacturers' Association of Finland. They asserted that eco-labelling in general might develop more given the interests of those participating in it (See Part 3), given the political power of consumer associations in Europe and ISO advocates in the world (Ecologia Sourced September 23, 2000). Overall, European industry has in general taken a very reserved position vis-à-vis the development of the community eco-scheme. Certain industry federations such as the European Association of the Textile Industry and the European Confederation of Paint Manufacturers have fully supported the implementation of the community eco-label in their sector. For other product categories considered (e.g. tyres), the relevant industry associations have participated in the preparatory work at some stages alongside other interest groups, but a sufficient consensus has not been reached on solutions meeting their support (European Commission 1996).

Based on what has been said in Part 4.2.2 as regards the question of whether the Company should go for SWAN or European eco-schemes, it would be hypothetically more appropriate for Trelleborg to choose Nordic SWAN labels because of many reasons. The Nordic SWAN label has many successful stories in eco-labelling in products such as printing paper, and detergents. The Nordic SWAN eco-labelling scheme has 48 product groups having criteria products set and 900 licenses issued (Sylwan. *Pers.Comm.* November 14, 2000). Secondly, based on the CLD in scenario 2 (Figure 2), and on the SWOT analysis (Figure 1), the volume of sales of agricultural tyres shows that the biggest market of Trelleborg tyres in general is in Scandinavian countries. The main market where eco-labels Type I are strong. Thus, it makes more sense for the Company to go *hypothetically* for SWAN, which is both credible and visible to the Nordic customers who constitute the major parts of the customers of agricultural tyres. According to the European Commission report in 1998 on Integrated Product Policy workshops, 96 % percent of Swedish consumers recognize the SWAN symbol and the label has a high credibility among manufacturers and consumers. In 1998, a survey showed that more than 80 % of Norwegian customers know that the Swan Label is the official environmental label, and they say that they prefer products with the Swan label.

The EU eco-scheme (EU flower) has a limited success in terms of certified products. "Current statistics to date are 53 licenses for the use of the EU eco-label logo have been granted to 40 manufacturers and 2 importers for about 250 products" (SIS Eco-labelling November 15, 2000). Unlike the SWAN (Sweden, Norway, Denmark, Finland, and Iceland) and the Blue Angel (German), which seek the improvement of the quality of their labels (e.g. limit the uncontrolled claims), the EU eco-scheme aims at developing a proximity to the stakeholders including the industry. The EU scheme also has a low promotion budget. The communication efforts of the competent bodies are not sufficient to promote the use of the eco-label. Finally, the EU scheme does exclusively depend on LCA methodology, which makes it closer to the methodology of ISO 14025 (Type III) that companies might not be able to use (Taylor 1998). Thus, in the IPP workshops, the Swedish consumer organizations as well as the EPA speakers suggest to the other participants that the EU should promote the use of eco-labelling and the use of LC thinking rather than an LCA.

Does this say that the EU eco-scheme is not appropriate for Trelleborg Company in the future? With the possible increase in credibility and visibility of the EU eco-scheme, the growing market demand, and

production capacity of agricultural tyres in Europe and the world (Trelleborg Company Three Month Report 2000), the European eco-scheme might constitute another potential opportunity for the Company to increase the popularity, visibility and credibility of the product brand internationally. Realistically, given the fact that there are not yet any criteria for eco-labelling of agricultural tyres, one might safely say that eco-labelling influence is a non-existent factor on their customers purchasing decisions. Thus, the alternative option to meet the demands of the local stakeholders is to currently consider the option of self-declarations (Figure3). The following section reveals the lessons that the Company can learn from the experience of other competitors.

#### **4.2.3 CAN TRELLEBORG LEARN FROM THE EXPERIENCE OF OTHER COMPANIES?**

Considering the expected benefits of ISO Type II to consumers, the impacts of self-declarations on consumer behavior are still not clear in the tyre manufacturing market. This is partially because it is premature and fairly uncertain to assess the market effects of these declarations. The same remark can be noticed for both Type III and I. Given the fact that the eco-label and the LCA based product declarations are still in a relatively early stage of development, they have not yet gained sufficient visibility and credibility in the market place (Cox. *Pers.Comm* September 21, 2000) (Koen. *Pers.Comm*. September 18, 2000). Hence, the author affirms that it is uncertain that Goodyear has gained from the initiative of adopting environmental declarations in the short run. This is because the market effectiveness of EL is dependent on its visibility to and credibility with consumers (Elejabeitia. *Pers.Comm*. September 14, 2000). The fact that Goodyear's first quarter sales were \$3.5 billion in 2000, versus \$3 billion in 1999 does not at all say that it is thanks to their self-declarations (Tyre Online Sourced September 23, 2000). This statement is quite obvious because an increase in sale might come from different factors. Looking at the profile of the Company makes one think that this increase in sales might come from the positive contribution of Research and Development innovations, salesman capabilities, the image of the Company's brand in the market as well as other product mix strategies and so forth.

Looking at the actual influence of the so-called Goodyear's self-declarations that are exerting on the producers in general, the author asserts that self-declarations cannot be seen as a current threat to the other competitors including Trelleborg. Goodyear's initiative cannot at least be seen as a threat in Sweden because Trelleborg Company has popular product brand that customers trust (See Part 2.2). Besides, Goodyear only markets 10 to 20% of its tyres in Sweden which far below the capacity of Swedish demand for tyres (Detterman. *Pers.Comm*. November 14, 2000). The fact that Goodyear manufacturers are the only ones who have developed these environmental declarations of their agricultural tyres is still not been sufficient for the local authorities to only purchase Goodyear's product.

The initiative of Goodyear cannot be considered as a current threat to Trelleborg Company because of the following. The author assumes that the local authorities are currently considering other issues besides this certification or environmental considerations before their product procurement through the tyre dealers from the companies. Examples would be the price of agricultural tyres, the brand name, and the customer loyalty (if they are used to a particular brand product it may be difficult to switch to other brands). Hence, self-declarations will not have an impact on the sales of agricultural tyres of companies unless there is more pressure from regulators on tyre manufacturers, and more demand from the market. Therefore, it is partly understandable why companies are not currently keen to develop more self-declarations of their agricultural tyres. On the other hand, since Goodyear has an environmental declaration on the backside of their price list it will be much easier for the tyre dealers to make offers to the local authorities (Victor *Pers.Comm*. November 13, 2000).

#### **4.2.4 LIFE CYCLE ANALYSIS BASED ENVIRONMENTAL PRODUCT DECLARATIONS**

Up to now, the final standard for Type III declarations has not been established (ISO/TR 14025, 1999). Within the framework of the EPD system, eight documents have been prepared describing Product-Specific Requirements. Examples include PSR-documents about the production of electricity and distant heating (PSR 1998:1), dairy transports (PSR 1999:2), fuels, insulation materials (PSR 1999:8) and so forth. 7

product categories have been awarded this type of declaration (Swedish Environmental Management Council Sourced October 20, 2000).

Trelleborg Company is more likely to be directly involved in some of the stages of Life Cycle thinking. Trelleborg participates together with the BLIC in research projects that intends to chart the environmental effects of rubber components (e.g. ZnO) and tyres throughout its life cycle (Environment Report 1999). This also goes exactly with the environmental policy of Trelleborg, which records their current "high concern with the spread of harmful substances and life-cycle issues". This was also reflected in the answers of the staff members who know that all the production processes of tyres are interconnected and have an impact on safety, health and environment. And that any step initiated by any other department might affect other offices, which affect at the end the HSE considerations of agricultural tyres. The concept of life cycle thinking is informally adopted within the Company in the sense that employees are aware of the relation that exists between actions and impacts in various life cycle phases. However, most of them reveal that they do not have any competence in dealing with the Life Cycle thinking as part of their environmental management system routines. This is also supported by the view of the vice president of environmental affairs at Trelleborg who reveals that the Company does not have any general "internal competence" for the LCA. Further discussion of this point will be tackled in Part 4.3.2.

### 4.3 CONSTRAINS

The following section examines the general constrains of ISO 14020 series in general as well as the specific constrains particular to all the three types of ISO 14020.

#### 4.3.1 GENERAL CONSTRAINS

**Labelling Confusion:** There has been a lack of overall direction and coordination concerning environmental first and third party labelling progress, which has created confusion to many stakeholders including customers, and producers. Many countries do not recognize labels, understand details of labelling programs, or have any strategy regarding the issue of labelling (Khure 1997). This is supported by the feedback of some tyre manufacturers who seem to be confused of the meaning and progress of environmental declarations and labels. Some of them assert to know about ISO 14020 series but not about self-declarations, which is quite a contradictory idea in itself (See Part 5.2.4).

**Lack of Demand and Credibility:** Market and regulatory demand constitutes a major impediment for the companies interviewed that would hinder many manufacturers from implementing ISO 14020 series in general and ISO Type I in particular. The market will not change unless tyre manufacturers partly perceive a more pressing market where all stakeholders (customers, competitors, and regulators) give serious importance to the first and third party labelling issue in general. This can be understood in two ways:

- 1) Most competitors interviewed know ISO 14020 series but do not intend to use it (e.g. Nokian tyres say: we know it. But we do not use it (yet?) (Leppänen. *Pers. Comm.* September 25, 2000);
- 2) Most competitors do not have clear information about ISO 14020 Series (See Part 5.2.4).

Other general constrains of the three types of ISO 14020 series include the fact that competitors do not perceive it as a marketing tool. This is because the annual report, bulletins, and brochures can also be one of marketing mix tools, which they can use to reach the customers and add value to their products (See Part 5).

#### 4.3.2 SPECIFIC CONSTRAINS

**ISO Type I: Trade and Socio-Economic Barriers:** Considering the fact that Trelleborg is operating in many other countries all over the world. It would need to consider what will happen to its overall sales, performance and image if it decides to eco-label the agricultural tyres. This might be true for tyre manufacturers and customers being in some developing countries like Srilanka, which is not used to process all the technical information required by the this type of ISO because the environmental information is usually hard for the consumer to understand (Kuhre 1997). Less interested in the HES environmental

attributes that a product brings to them, they might find the price more appealing when it comes to purchasing specific product. Hence, eco-labelling does not necessarily help them to make rational purchasing decisions. This is another example, which hinders eco-labelling from being a genuine policy tool (OECD 1997).

**Eco-labelling Criteria not yet Developed:** While the setting of eco-labelling regulations is speeding up, the clear setting of criteria for tyres in rubber industry is not yet developed. No work has officially been done for setting the criteria for the eco-labelling of agricultural tyres. Considering the position of European industry and competent bodies (See Part 4.2.2), tyres are considered to belong to the product categories where the relevant industry associations have participated in the preparatory work of eco-labelling for passenger car tyres at some stage alongside other interest groups. However, a sufficient consensus has not been reached on solutions meeting their support (European Commission 1996) (European Commission 2000) (Dutch and Spanish European Bodies 2000).

**Information Availability versus Information Business Confidentiality:** The means of obtaining the information about Company products shall be known to the purchasers wherever the product or service is marketed. However, there may be limits to the availability of specific information due to confidential business information, and intellectual property rights that gives the manufacturer the right to withhold certain product information (Khure 1997). For Trelleborg Company, information availability may still be an issue, in terms of does the Company have the information about the environmental impacts of their products. Which is quite time, resource and money consuming.

**Financial and Economic Considerations:** Even if there are not yet criteria set for third party verification of agricultural tyres, it is necessary to consider a very important issue: Is ISO Type I economically viable for Trelleborg current profile. Based on what has been pointed out earlier in Part 3, for manufacturing companies like Trelleborg, problems related to eco-labelling are not only related to the internal competence but also the labelling costs.

**Table 5: Eco-Labels in \$**

<b>SWAN Label</b>	<b>EU Eco-Label</b>
<p>One time Application fee = Between <b>US \$ 375 and 1500</b> depending on the country. Application fee in Sweden is SEK 15000 corresponding to US\$ <b>1,489.25</b>.</p>  <p>If the application is granted, licensees also must pay an annual fee in each country where the label is used</p> <p>Annual fee = <b>0.04 % of the applicant's turnover</b> of the labelled products (with a minimum of 10000 SEK and maximum 350000 corresponding to a <b>minimum of \$ 99,4036 and a maximum 34,791.25</b>) and the tax of value added (VAT) per production unit.</p> <p>The product registration = a <b>minimum</b> of approximately <b>\$750-1400</b>, and a <b>maximum</b> of <b>approximately \$5500-45000</b></p> <p>Source: SIS Eco-Labelling AB 2000</p> <p>Exchange rate: Wednesday November 15, 2000 1\$=10.0600 Kr. 1Euro = \$ 0.857100. The Universal Currency Converter. <a href="http://www.xe.net/ucc/convert.cgi">http://www.xe.net/ucc/convert.cgi</a></p>	<p>Application fee = 500 Euro corresponding <b>\$ 428.550</b></p> <p><b>0.15% of EU sales</b> of the product (with a <b>minimum</b> of 500 Euro corresponding to <b>\$ 428.550</b>) and <b>cost of the tests</b></p> <p>Source : <a href="#">Elejabesitia Pers.Comm</a> September 14, 2000</p> <p><b>Reduction of 25% of the fee</b> for developing and Semi and Middle Enterprises.</p> <p>Source: SIS Eco-Labelling 2000</p> 

Assuming that the criteria for the eco-labelling of agricultural tyres would be developed, the author would still consider the question of the willingness to pay (WTP) of the corporate managers to the certification. Table 5 shows the cost for both the SWAN and EU eco-labels. It seems that the cost of SWAN label is not quite high if one considers the discussed benefits that it might bring to the Company. Also, compared to what companies are spending on advertising booklets and

advertisements in journals (\$400000 for Trelleborg Company), both costs should not be considered high for most of the tyre manufacturing companies. Many companies, however, will still not be willing to be the frontrunner of their competitors regarding the eco-labelling issue unless there is a pressing demand for it from the market (Spencer. *Pers.Comm* November 6, 2000).

**ISO Type III: Life Cycle Analysis Product Based Declarations**

ISO Type I and II are based on a life cycle approach (*not necessarily an LCA except the EU scheme*). Type III, however, is based on LCA including criteria related to production processes and re-use, recycling, disposal of waste. There is currently a study of the LCA for passenger car tyres. The study is ongoing and

data is collected from production sites, waste operators, suppliers of raw materials etc. The study is strictly based on the requirements of ISO 14040. The endpoints are defined as "Human health" (damage is expressed in Life Lost Years or Life Years Disabled), "Ecosystem Quality" (damage expressed as Potentially Disappeared Fraction of species), and "Resources" (damage is expressed as increased energy use for extraction of resources in the future). Investigated parameters are for example: carcinogenic, ozone layer depletion, use of fossil fuels, noise, ecotoxicology, acidification, eutrophication, climate change, radiation, minerals, etc (Brorson, *Pers.Comm* October 20, 2000), which is all data that needs money, time, competence to collect and follow up for most companies.

In its attempt to contribute to the criteria document for eco-labelling passenger car tyres; the BLIC is doing an LCA for these particular tyres to assess their environmental impacts during all life cycles of its processes. "BLIC has limited resources, and therefore the LCA study was started with passenger car tyres. Once this work is ready, it will be very easy to introduce the same exercise for other tyre types, the methodology already being there", says Tuula Rantalaiho, a representative of the Rubber Manufacturers' Association of Finland. This is also supported by the Technical Manager of Trelleborg Company who said:

"As you certainly know an LCA study will take a lot more than a couple of months. The overall situation regarding LCA on tyres is that BLIC the European Rubber Federation has started an LCA study on a car tyre that will run over a 2 years period. Based on results from this study additional LCA will be done on other tyre types. The actual status is that it as usual is hard to get the right data into the system covering all necessary aspects" (*Pers.Comm.* October 27, 2000).

Given the future demand for this LCA, and given the hindrance of LCA including its costs, the Vice President of Environmental Affairs at Trelleborg reveals (referring to LCA):

"I think it will be needed sooner or later, but what I have heard from Wheel Systems is that the customers not yet require it. However, I'm am convinced that it will come. I am not so sure that Trelleborg will conduct such a study as the cost is very high and we don't have any internal competence. It is perhaps more likely that an LCA would be conducted together with some other Company" (*Pers.Comm* October 20, 2000).

As regards EPDs, the registration fee for the EPDs is \$999,148 with an annual fee of 0.1 per mille of net sale of the product and with a SEK 1000 to 25000 corresponding to a minimum of \$992,148 and maximum \$ 2,480.76 (Exchange rate See Table 5) (Swedish Environmental Management Council 2000).

To close, all the types of ISO labels and declarations seem to have many problems. Based on the causal loops that were developed at the beginning of the thesis, these impediments would definitely push the stakeholders including regulators and ISO advocates to review its basis and may look for other tools of product policy to ensure its efficiency. This is supported by the views of experts and academics who participated in Brussels workshops as regards Integrated Product Policy (European Commission 1998).

**Figure 15: Tailoring the SWOT to the labelling issue Figure**

Finally, Figure 15 summarizes the SWOT elements that the author gathered throughout this commission, which would further help in the discussions and conclusions.



## CHAPTER 5: DISCUSSION

This chapter attempts to discuss the various options of adopting ISO 14020 series and benefit from various experiences of the stakeholders. The chapter also analyses the SWOT analysis and causal loop data that were examined before to make the ultimate suggestions meet the economic, current and future needs of the Company as well as those of the most influential stakeholders and pressure groups. The chapter also suggests different options and a strategy that depict how the Company shall proceed while willing to adopt one of the environmental labels or declarations.

### 5.1 HOW CAN TRELLEBORG BENEFIT FROM ITS SWOT ANALYSIS?

Based on the SWOT analysis, the brand image (See Strengths) has its implications regarding the impact on customers. Agricultural tyres manufactured in Sweden are mostly appreciated by Scandinavian countries partly because of their image in the market. However, this is not necessarily and currently the case for Trelleborg agricultural tyres in the rest of the world. There, they have different production system, market demand, legal and HSE considerations in other outsourcing suppliers, especially if one takes into consideration the limited or low capacity of Trelleborg sales in the past (See Threats of SWOT). For instance, agricultural tyres TWIN tyres made in the United States, which are both energy and material demanding, are marketed in Europe as a Trelleborg product, which hypothetically should affect the future HSE image of Trelleborg product in these places of the world. It is true that this is not really a big issue for the meantime because the potential customers in these countries are not very demanding for green tyres. However, this might constitute another weakness for Trelleborg Company in the future. That is why enhancing the quality of agricultural tyres apart from Trelleborg Company would not only add value of their products in the present but also the future value as well, and is one of the basis of sustainable rubber industry. If the Company has positive international brand image in all over the world, this would add value to it product and attract more customers (Trelleborg Annual Report 98, 99).

### 5.2 HOW SHALL TRELLEBORG PROCEED?

Based on the constrains of LCA examined in Part 3.2.4, addressing the HSE issues of Trelleborg Company based on this analysis in Sweden and/or at the outsourcing countries would be difficult. Strictly speaking, pollution aspect arising as a result of production methods outside of Sweden is not a priority issue. In accordance with legislative directives 67/548/EEC and 88/379/EEC, "the exclusion of products classified as dangerous, the concept of reduced environmental impact during the entire life cycle of a product; and the mandatory consideration of all the life stages of a product" are all crucial questions for an LCA methodology. Hence, the general problem appears to stem from the LCA attempt to satisfy too many different needs in a single analysis (Boustead 1999). This means that production related aspects should be addressed wherever they arise, which is impractical and unfeasible for most companies (European Commission 1996). Taking into account these considerations and based on Figure 9, Trelleborg should also consider stages including the transport modes they are using to transport the agricultural tyres, which also partly requires financial, technical and human resources. Which does not correspond to the present willingness, competence and resources of the Company. Also, if one addresses pollution outputs in the tyre production processes as it is shown in Figure 10 of the tyre manufacturing process, the production of components for tyres generates a large hazardous pollution outputs. Not all of these can currently be addressed in the LCA and thus in eco-labelling criteria for such analysis is extensive, time consuming and require information about processes that is not readily, if at all, available.

In the light of the foregoing, it is likely that Trelleborg will have to develop an LCA to the agricultural tyres in the *medium term* (e.g. simplified LCA). In this regard, the focal point of the Rantalaiho Rubber Manufacturers' Association of Finland advanced that BLIC is probably going for an LCA study to agricultural tyres once it finishes with the passenger car tyres. With his words: "Once this work is ready, it will be very easy to introduce the same exercise for other tyre types, the methodology already being there".

However, this is not quite true because LCA only uses an average data to thus provide companies with general ideas about the impacts they have in their product life cycle but no specific LCA methodology to specific Company product. The same goes for doing an LCA for two tyre manufacturing companies, unless they want to operate with average values, which might not say much about the specific productions systems of both companies. This means that the degree of efficiency of LCA is based on the way companies use it. Doing an LCA could constitute an opportunity in the SWOT matrix. The company shall start only by doing an LCA to identify where the agricultural tyres impact the HSE from an in-house production perspective. In the long run, however, it shall go for an LCA that maps the entire supplier-industry post-production chain. Here, it is note that if Trelleborg decides to go for an LCA in the medium or long run, sensitivity analysis, criteria review, and interactive process of interpretation would ensure that false interpretation and misunderstanding be limited (Byrnes 1998). The HSE department should avoid the usual problem of the technicality of the LCA document (See ISO Requirements of ISO 14025), the challenge here again is that the report should be accompanied by a small report that is easy to read and understand for the average user.

To that aim, Trelleborg Company shall continue to integrate Environmental Management System (EMS) but with a life cycle thinking that is a thinking that takes into account all the relevant processes related to tyres (See Part 3.3.4). If Trelleborg would like to eco-label its product in the future, it should consider the LC thinking to agricultural tyres to make the conduction of an official LCA more manageable. Note that the Principle 5 (Part 3.2.1) says, "The development of EL shall take into consideration all relevant aspects of the life cycle of the product". This also is supported by Figure 2 (CLD), which depicts that life cycle thinking is a very important step to go for eco-labels and declarations. Thus, LCA is chosen to be a *long-term option* as it includes many parameters that a Company might not be able to tackle in the short term given its current capacity, and needs in the market.

A flavor of considerations that should be taken while developing this report shall include:

- ◆ The Company should narrow its product category for example to agricultural tyres (new tyres or retreaded ones).
- ◆ Feasibility report based on a review of different stakeholders and available life cycle data for tyres.
- ◆ Determine life cycle stages of tyre production and their key environmental features.
- ◆ An impact assessment should be performed to simply categorize the key inputs and outputs into impact categories and identify impacts as local (noise), regional (acid rain) and global (global warming). Examples of the impact categories shall include energy consumption, consumption of raw material.
- ◆ Labelling criteria shall discuss the life cycle impacts, which might include the limit on energy consumption, limits on emissions of CO<sub>2</sub>, SO<sub>x</sub> etc, limits on releases of fumes, procurement of raw material from "clean suppliers" etc.
- ◆ The internal consultants should define the goal of the LCA, e.g. semi quantitative since it is not possible within the time and resources available to compile data for all products and substances involved in the production of TWIN tyres.

### 5.3 CAN TRELLEBORG BENEFIT FROM ITS STAKEHOLDERS?

Considering the pressure that stakeholders exert on Trelleborg Company (Figure 13), the author suggests that the Company should involve them into setting the HSE parameters of interest to them that are to be included in the self-declarations. The Company shall communicate their declarations to the potential purchasers (tyre dealers) and ask them in return to give their feedback about the declarations. Getting to communicate with the tyre dealers and the local authorities and institutions shall definitely reinforce the positive image of the product and add another benchmark to the annual environmental report of the Company. A genuine communication also requires that Trelleborg send their declarations to their competitors, which might not currently be willing to go for eco-labelling.

Another form is to learn from the experience of other competitors (e.g. Goodyear), countries as well as the specific profile (HSE records, needs and capacity) of Trelleborg Company and try to tailor a product policy,

which fits the capacity as well as the present and future needs of Trelleborg Company. These ideas are further elaborated in the following points.

### 5.2.1 FROM COMPETITION TO LEARNING EXPERIENCE

Borrowing Halme's phrases, the author would say that in order for the environmentally benign decision-making to happen, "it is essential that in the period when old and new ways of doing things compete, the organization gains positive experience from the environmentally improved actions. External reinforcement of the success of the new practices accelerates the cultural shift and, in many instances, may be necessary for the shift to proceed." (1996). Thus, it would be wise to learn from the new experience of Goodyear. Goodyear disseminates information to its all its competitors once they have produced their environmental declarations. This is proved by the brochure of self-declarations of their product that was sent to Trelleborg Company.

Keeping the "T" of the SWOT approach in mind, theoretically speaking Goodyear seems to be a threatening competitor to Trelleborg Company. However, if one considers the low visibility and credibility criteria of self-declarations in the market and in Europe, this initiative would not probably mean so. According to Dirksen et al 1997, there are "three common arguments against self-declarations and in favor of eco-labels: credibility problems due to lack of third party testing; the lower user-friendliness as compared to eco-labels; and no determined threshold of acceptable levels" (1999). According to the representative of Spanish competent bodies (*Pers.Comm* September 14, 2000), "A Company can choose to use type II declaration on its products, but it is clear that the credibility and transparency of type II is far lower than in the type I." However, from a producer point of view, self-declarations are cheaper and "the time-to-market shorter" Granada et al (1998). Bearing in mind these arguments against self-declarations, this would not constitute a real threat to Trelleborg Company. However, the author sees their initiative as a very good learning experience to Trelleborg Company.

Based on Principle 9 of ISO 14020 Series, if Trelleborg wants to go for self-declarations of Twin tyres, they should inform their purchasers about this environmental step, as was done for the reporting of the consequences of rubber production in 1998. This can be accomplished through various means, such as advertising, explanatory panels at the retail level, free telephone numbers, among others. The information provided shall be appropriate and sufficient to the nature and scope of the environment claim being made (ISO 14020 1998) (Kuhre 1997). This situation is less probable to happen in the outsourcing suppliers (e.g. Srilanka, Byelorussia and Romania), where the local authorities are less keen to procure clean products and where the market pressure of green products might be low. These kinds of impediments are not only linked to self-declarations but also to third party verification given the socio-economic differences among these countries. However, since Trelleborg Company is the first responsible for selling the product and not the outsourcing suppliers, they do not only have to exert pressure on their suppliers through their demands but also support their environmental management.

#### Self-Declarations: as a Marketing Tool for Big Companies

Self-declarations, however, shall be used as a tool to market already branded products. According to one of the competent bodies of Europe, he or she states:

"If I was an important Company and my product brand well known among consumers and my sales volume enormous then I will use a self declaration because consumers are interested in my product. With the self-declaration, the Company as a responsible organization gives information on the environmental performance of the product. But what is really important is my commercial mark" (*Pers.Comm* Monday, September 18, 2000).

That is to say that the credibility issue would constitute a problem for Small and Middle Enterprises, as they do not have already an established image among customers. However, for big companies, even with the lack of visibility and credibility of self-declarations among customers, this latter would remain trustful to the

brand that he or she has been using and testing. Thus, self-declarations in the case of big companies would reinforce the information companies give about their product. Taking the customer demand into consideration (Figure 2), self-declarations if attached to the price list of agricultural tyres, will constitute a good way to make tyre dealers confident to the Company's product and the local authorities too. For tyre dealers, self-declarations are a means of distinguishing between the products that are presented to the local authorities. As for local authorities, self-declarations shall constitute a way to procure "environmentally friendly" products that are the least harmful to the health, safety and the environment of Trelleborg people, environment and society.

Based on Principle 5 of ISO 14020 Series, consideration should be given by Trelleborg to the life cycle of a product in order to help point out appropriate and relevant characteristics and criteria for environmental declarations and to determine the significance of an environment claim.

For example, it is not "relevant" from a formal point of view to declare that Srilanka is not using aromatic oil in the production of its tyres while the factory is only using Paraffinic oil.

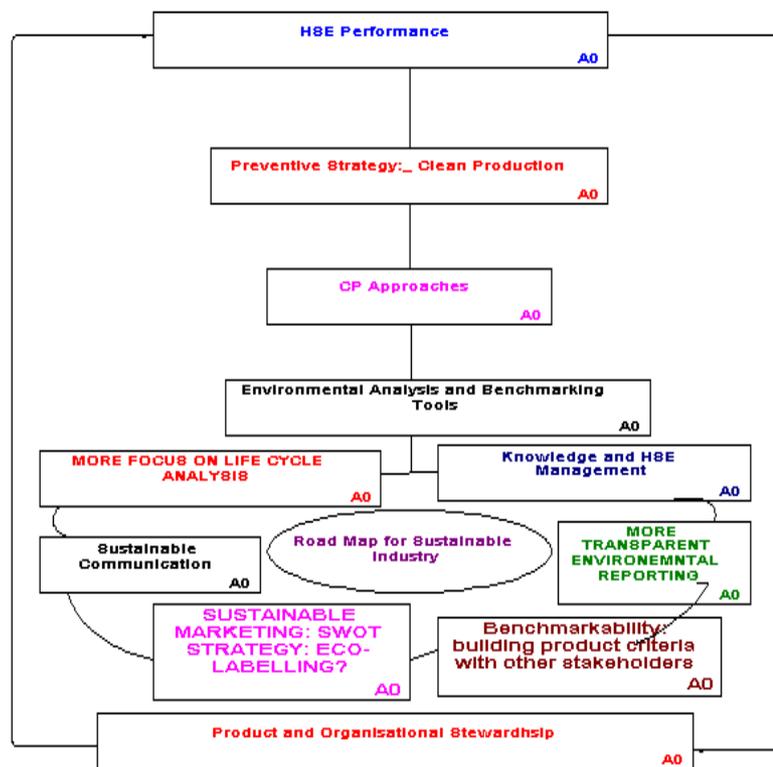
Thus, from a business point of view, self-declarations do not only seem to put less pressure on the Company and make them operate with the pace of their performance, but also is "a wise and responsible" decision given the current situation of the labelling issue in Europe. Self-declarations give a free field to the Company to choose the positive and/or negative impacts of the life cycle of a product that shall be shown to the purchasers. Here it is to note that declaring only the positive information of the agricultural tyres might be considered as a kind of "brainwashing" especially for the knowledgeable customers. Declaring negative information (information disclosure) about the tyres, however, give more transparency and credibility to the produced declarations in general, but might be considered as information disclosure for some manufacturers and thus might not constitute the preferred option for many companies.

**5.2.2 A MORE SYSTEMATIC CHANGE IS REQUIRED**

Considering the road map of sustainability shown in Figure 16- Sustainability is defined as opting for cleaner production strategy that would allow producers to meet the needs of current stakeholders (customers) without compromising those of stakeholders in developing countries and of the future generations.

To increase its strengths and cease the business opportunities that are offered by the customers, a more systematic change is required. Trelleborg is increasingly ambitious to integrate greener decisions, products and cleaner production approaches within its all aspects of production. This is reflected in its annual environmental reports, its environmental performance throughout the years (1970 to 2000). This also shall be touched in its adoption of ISO 14000 and its willingness to extend the

**Figure 16: Road map for sustainable industry**



environmental management to the countries of its outsourcing suppliers, which is a benchmark of "Producer Responsibility" (Environmental Annual Report 1999-2000) (Federation of Swedish Industries 1998).

According to the environmental report 1999, Trelleborg product stewardship as related to ISO 14000 programs will foster the use of environmental information in private sector procurement and product design (EPA 1998) which aims at enhancing the overall HSE performance. Keeping in mind the road map of "Sustainable Industry", Trelleborg Company should consider many issues within the current environmental performance matrix of the Company, and raise issues before the environmental labelling or declarations is well underway. That is why, all departments should prepare for it including the HSE, Legal, Marketing, R&D.

First, if Trelleborg Company would like to go for self-declaring its agricultural tyres, they can use the "Brand Mechanism" as an efficient tool in integrating environment into the product system. In this case the brand "TWIN" agricultural tyres at Trelleborg Company in Sweden would offer strength to the SWOT marketing strategy. This mechanism is good in the sense that branded products focus on quality in broad terms and products are expected to take care of environmental issues as an integral part of quality (Drury 1998). In this context, there are many types of agricultural TWIN tyres, each with different properties and functions and common set of advantages and disadvantages. According to all the interviewees of Trelleborg Company, TWIN tyres comply by the HSE standards as they relate to chemicals, testing, safety, construction and so forth. If the Company, however, would like to go for eco-labelling of their agricultural tyres, Trelleborg cannot go for an immediate application for third party eco-labelling because simply there are not yet a set of criteria for eco-labelling agricultural tyres.

Considering the possible implementation of environmental eco-labelling in the long run (e.g. in 6 years), it is necessary that the product continuous testing methods (e.g. ZnO), laboratories and controls shall be done and documented. This is important because the third party verifiers would use this information in their study, and put less time in working with the company, which would make the eco-labelling process more genuine and efficient. And as it is requested by the Nordic Eco-labelling for eco-labelling of passenger car, all eco-scheme applicants should present a training plan for marketing personnel regarding requirements prescribed in the eco-labelling criteria, and principles. It is necessary that it should train its employees beforehand about the issue and try to get their feedback about it. Talking about which knowledge, and skills is needed for the employees; which employees are to be trained; and who will conduct the training are very important questions to raise but they are beyond the scope of this thesis (Halme 1996).

**Table 6 Tyre test methods for product performance: car passenger tyres.**

Examples of the tyre test methods that Trelleborg shall further investigate are presented in table 6. The test parameters are produced by the Nordic Eco-Labelling in the criteria document for passenger car tyres and shall serve the Company to trace the most likely characteristics that a third party verifiers would ask for while assessing HSE product performance (1998).

Trelleborg is currently using different prototype product testing such as construction, width, weight, working conditions, rolling circumference (distance traveled in 1 km), amount of PAH, and heptane. Noise will be measured very soon (Lenander

Requirements	Analysis/Measurement	Documentation
<b>Chemicals</b>	PAH analysis Environmentally friendly substances	Acc to IP 346 Acc to 67/548/EEC
<b>VOC Emissions</b>	VOC Pollutants	EU 96/0276 Proposal of similar method.
<b>Rolling Resistance</b>	Noise	ISO 8767:1992
<b>Environmental Matrix</b>	1-Manufacturing Energy 2- Solvents 3-Zinc	applicant's declaration applicant's declaration Atomic absorption or similar method
<b>Construction</b>	Methods used	applicant's declaration
<b>Optimization of material</b>	Tyre weight	applicant's declaration
<b>Manufacturing waste</b>	-	applicant's declaration
<b>Function of Tyre</b>	-	Applicant's declaration

Source: Nordic Eco-Labelling 1998

*Pers.Comm* October 2, 2000).

Like their top ranking competitors (e.g. Goodyear, Michelin and others), Trelleborg is following the International standard organizations: ETRTO, Scandinavian Tyre and Rim Organization (STRO), International Standard Organization (ISO). (Lenander *Pers.Comm* September 25, 2000) (Victor *Pers.Comm* 2000). Hence, this would help the Trelleborg Company to more consider the possibility of eco-labelling of its agricultural tyres in the future.

Considering table 6 regarding the chemical and material use, improving the general environmental matrix (Nordic Eco-Labelling 1998) would have a positive impact on the future preparation of the Company for the development of self-declarations in the short run and the third party verification in the long run. These tests as well as research and development endeavors constitute a benchmark for Trelleborg Company that should show it to its customers; and self declarations is the cheapest, easy way to communicate these HSE improvements especially to the local and regional market (Scandinavia).

Looking at the criteria document for eco-labelling passenger car tyres and the difficulty of setting the test methods for products in general (Boustead 1999), many environmental matrices such as water quality, waste reduction, global warming prevention, environmental safety, and noise were not included into the test. This theoretically shows the limitations of the testing criteria. It also shows the fact that companies might devote more work to specific environmental matrices compared to others. However, from a pragmatic point of view, the environmental matrices determined in table 6 take into account the technical and economic feasibility of adaptations needed to comply with it. Calculating the carbon dioxide of the processes of production of agricultural that contribute to global warming is not an easy task for an average officer. It eventually needs some competence to do it, which constitutes another constrain inherent to the eco-labelling characteristics in general. Hence, if ever there will emerge a third party verification to agricultural tyres, more instructive and constructive communication among the competitors is then necessary to assess if the criteria of environmental matrix are practical or not and communicate it to the third party verifiers.

Based on the previous discussions about self-declarations and on the Goodyear's model of product-declarations, the author dares to conclude that Trelleborg is prepared for self-declaring some positive environmental characteristics of their agricultural tyres. Examples shall include the following items:

- The functions of tyres  
e.g. multipurpose, tubeless, garden, forestry tractor etc.  
e.g. the importance of low pressure on the ground. The importance of maintenance instructions of agricultural tyres.
- The construction:  
e.g. the new tyre manufacturer's declaration of marking of tyres which are suitable for retreading (carcass), and a statement about how many times TWIN tyres can be retreaded and a caution saying that it is not always evident that a retreaded tyre is more environmentally friendly than a new tyre because it wears faster and has higher rolling resistance which contributes to higher fuel consumption)
- Positive and negative impacts on soil (low compaction on soil) and bio-diversity  
e.g. steps to limit the compaction damage for the users (e.g. the local authorities): Use short, illustrative and clear information of the Technical Support Manager articles when it comes to this point. However based on Principle 6 of ISO 14020 Series, prescriptive design features or criteria or explicit preference for a tyre category should be avoided. This is because of the possibility of restricting improvements in products or services (e.g. new standard tyres), which are not conform to applicable environmental performance of another product category (e.g. new TWIN tyres).
- Use of less hazardous substances  
e.g. the level of PAH (less than 3% of aromatic oil) in their tyres. According to the one of the focal points of Michelin Company, which is considered as one of the biggest competitors to Trelleborg Company, this factor is a criterion for a "good" environmental tyre. In his words he said: "The real criteria for environmental good tyre...In Sweden for the last 5 years it has been do your tyre have HA-oils with

PAH" (Hoglund. *Pers.Comm* October 06, 2000). Finally, comparisons shall be made to show the importance of the data conveyed to the procurers.

e.g. some components of the environmental matrix (use of solvents)

e.g. the use of heptane: present and future targets (note that contrary to goals, targets means providing more precise information to the customer)

- Waste Management

e.g. may be include declaration on a waste sorting and re-use of tyres:

e.g. no tyres will go to landfill in 2001.

e.g. information on suitable procedures for recovery of selected parts or the entire production. Example of information of this nature may be about how composite materials could be separated and data of melting points and energy content of materials in goods.

e.g. information on a suitable method of re-use of production or parts of the production and the proper handling of the product as waste at the end of life cycle (Swedish Environmental Management Council 2000).

- Service and Maintenance

e.g. information may be about how the product shall be handled, during service and maintenance, and what to do to decrease environmental impacts during the use of products (Swedish Environmental Management Council 2000).

The last two examples (recycling, service and maintenance) are taken from the requirements for environmental product declarations of ISO Type III as part of the information that can be included in ISO 14025 Environmental Declarations (the Swedish Environmental Management Council 2000). The author suggests that Trelleborg can use some of these suggested parameters to tailor self-declarations of agricultural tyres. The idea behind this choice is that Trelleborg shall possibly develop self-declarations that have a closer vision to the Type III, so that in the future the probability for adopting ISO Type III will be more manageable. Trelleborg Company should not include agricultural tyres with low HSE parameters in the positive product declarations. In this context, Trelleborg can consider this point by declaring some negative criteria that the standard implement tyres entail so far. From a Company perspective, this would not really affect the market for these kinds of tyres since they have already high demands on them. Importantly enough, the Company shall not qualify their product with general terms like "environmentally friendly" or "environmentally safe" because the customer knows that rubber industry have many impacts on the environment that makes their products illegible for carrying this generalized term (Leubuscher 1998). Additionally, contrary to Goodyear, the Company shall say *explicitly and consciously* that the self-declarations they are producing are linked to ISO 14020 series. Thus, the information should comply by the general principles of ISO 14020 Series. This would add even more credibility of the procurers to the Trelleborg tyres.

Finally, consistent and continuous work is needed to boost up the quality and credibility of self-declarations. The internal human resources shall help a lot in hitting these targets. Goals shall include issues such as energy consumption, waste reduction, and measures of Volatile organic compounds (VOC) (e.g. solvents). They also shall entail emissions, noise level, the increase in the lifetime of agricultural tyres, the optimum agricultural tyre performance in working conditions (measured by heat and the traction that is the maximum force a tractor can pull) (Lenander *Pers.Comm* September 25, 2000) (See data in Part 2.4-2.5). That is why, there should be "knowledge managers" devoting full time in getting these issues to be totally investigated and potentially accomplished. The Company should also generate testing to more criteria (e.g. treadwear) especially in the countries of the outsourcing suppliers. Here again, The factory at Srilanka should be given more attention, as it is an integral part of the parent company. Further improvements of the environmental goals and targets can be recorded in the annual environmental reports of the Company and in the declarations themselves.

### 5.2.3 LEARNING EXPERIENCE FROM OTHER COUNTRIES

Based on the opinion of consumer council organization, in the short term, Trelleborg, with the help of the Research and Development department, has another possibility of manufacturing agricultural tyres with specific criteria without singling out the eco-labeled ones. Trelleborg, like Japan and Canada, shall provide the customers

with environmental information about their products, which are not necessarily, eco-labels (Cadwell 2000). This is a solution to Trelleborg Company if they want to build a kind of trust routine/tradition between Trelleborg Company and the customers. However, would this option satisfy the customers is quite questionable given the high pressure of the local regulators who are more for concrete certification and declarations especially after the initiative of Goodyear to meet their demands.

#### **5.2.4 CAN TRELLEBORG REALLY COMMUNICATE WITH ITS COMPETITORS?**

According to the result of the survey (questionnaires, e-mails and/or phone calls) communication is another issue that hinders self-declarations and eco-labelling from getting further improvements. An obvious explanation is that the tyre market is not ripe yet for the labelling issue. This is supported by the divergent responses of the members' states of the rubber industry to the EC when asked whether or not they would like criteria for potential eco-labels of tyres (Cinaralp 2000). This gap in the visibility of ISO 14020 series in the tyre manufacturing companies, the distinction between eco-labelling and self-declarations as well as the lack of communication among companies would probably enhance the confusion of Company leaders. This would make them reluctant to explore the labelling issue, unless an external factor intervenes in the environmental product system. An example would probably be the growing pressures from some members' states of tyre industry on the EC to develop criteria for potential eco-labelling of tyres. More communication among the competitors is then necessary to assess if the criteria of requirements of third party verification are practical or not (e.g. global warming effects, environmental matrix, noise) and to communicate their feedback to the third party verifiers and the strategic stakeholders (e.g. EU and BLIC).

Having addressed the possible scenarios of adopting Type I, II and III of ISO 14020 series (Figure2), self-declarations type II is considered to be the most desirable, feasible and efficient option for Trelleborg in the current situation. The author deems it necessary to suggest both short and long term considerations to deal with the issue of ISO 14020 Series given the following: 1). The present and future marketing strategy of Trelleborg Company partly shows that Sweden currently constitutes the largest market for tyres of the Company, and reveals that there is an ever-growing market for Europe and emerging markets in the future; and 2). The agricultural tyres in other outsourcing suppliers do not so far comply with the same environmental standards and considerations of the parent Company, due to socio-economic and cultural considerations. Therefore, both short and long term development of product policies (EMAS, EL etc) might constitute a *strategy* for increased strength, opportunities, and threat (competitiveness) to all industries. The strategy in the chapter below is designed in a way that promotes environmentally and economically aware and sustainable behavioral patterns, which Trelleborg can opt for to meet the current and future demands of the stakeholders.

## CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Given the hurdles of all types of ISO 14020 series, taking into consideration the current performance and position of the Company in the local and international market, and avoiding the "wait and see" approach given the future prospects of product performance tools, the author concludes the following:

### 6.1 SHORT TERM CONSIDERATIONS

On the light of the foregoing, Trelleborg Company shall use self-declarations to add more value to its product for many reasons:

*Firstly*, in the absence of official third party criteria for agricultural tyres, self-declarations seems to be the most effective, cheap and short term solution to add value to their product and mainly satisfy the local stakeholders;

*Secondly*, only one of Trelleborg competitors has produced self-declarations for their tyres. Thus, self-declarations can be developed and used as a marketing tool to increase the information dissemination about the TWIN agricultural tyres "mainly" in the local market.

*Thirdly*, local stakeholders (local authorities and institutions) are the most apparent groups who exert pressure upon the Trelleborg Company. Thereby, providing them with environmental information about their agricultural tyres would probably make them more loyal to the Swedish Trelleborg Company.

*Additionally*, Trelleborg is prepared for self-declaring the positive environmental records of agricultural tyres they have achieved *so far* to the purchasers. Positive Self-declarations, however, should not include agricultural tyres with low HSE parameters because they do not live up to the environmental product requirements of the local authorities. In this context, Standard Implement Tyres is the issue to be considered. To deal with the general problem of credibility of self-declarations as well as its lack of visibility that was shown in the response from Trelleborg competitors (See Part 4.2.3), the Company can build up its own reputation by carefully developing their declarations.

*Finally* even if self-declarations do not have official assessors and have broad principles such as *accurate, verifiable, relevant, non-deceptive, not misleading* etc (See Part 3.2.1) companies should develop them seriously. This is mainly due to three reasons.

*First*, the main stakeholders to whom these self-declarations are offered are very aware of HSE issues and are always seeking procurement from who gives more in the auction.

*Second*, this information should allow purchasers and other interested parties to evaluate and compare EL in terms of scientific principles, relevance and overall validity, and to assess whether an environmental label or declaration is consistent with the applicable standards within the ISO 14020 series (see Principle 4-Part 3.2.1). This is important in the sense that this is what might increase or decrease the credibility of ISO Type II and increase or decrease the performance of other competitors as regards the issue.

*Third*, if the principles are developed seriously, this will constitute another benchmark of the HSE performance of the Trelleborg Company as a whole, which would increase the product added value and its credibility from stakeholders.

It is better for Trelleborg Company to consider all the issues pointed out in Figure 16 in an integrated manner (Integrated Environmental HSE Performance) before the marketing declaration is well underway.

That is why, all departments should prepare for it (e.g. HSE, Marketing, and Research and Development), domestically and in other outsourcing companies before it gets more attention from the advocates. Special attention (auditing, visits, information dissemination, and communication) should be given to Srilanka that is an integral part of Trelleborg Company. Similar attention should also be given to Romania that produces standard agricultural tyres and the United States, which produces TWIN agricultural tyres (big tractors) that are far behind Trelleborg Company as regards the HSE considerations, tackled in Part 2.5.3.

## 6.2 LONG TERM POSSIBILITIES OF ECO-LABELLING AGRICULTURAL TYRES

Market led learning does not live for long. It is only when the "beyond compliance" initiatives are coming from HSE led learning that the companies would consistently add value to their products. Self-declaring all the products of tyre manufacturers would ultimately push the procurers and regulators to give more value to other ISO types including third party verification (Figure 2-3). However, this is not to say that ISO Type I is of less importance. Relatively speaking, the third party verification of ISO type II offers more credibility to the labeled products. In the future, it is more likely that eco-labelling would consider the mind of the BLIC, and tyre manufacturing companies including Trelleborg Company given the followings:

- The general European development of eco-labelling (Figure 11-12);
- The visibility and credibility of the SWAN label in Sweden;
- The interests and power of the EPA, ISO regulators; and
- The growing and enthusiastic interest of some of the member states of rubber industry as well as the consumer organizations (See 3-3-9) to ISO Type I.

If these factors are to persist, the tyre manufacturing companies including Trelleborg Company would definitely need to consider ISO Type I (Scenario 2). In the light of the foregoing, the "how" question might be crucial to the long-term adoption of eco-labelling. Thus, the author suggests an integrated way of implementing third party verification in the long run. This consists of a nice combination of ISO Type I and Type III, as both of them entail quantitative information, supplemented with a more qualitative information that partly satisfies the demands of procurers. Such initiatives, however, would require an internal competence and further research on the Life Cycle Analysis that defines the boundaries of the system under which Trelleborg would like to conduct it. Finally, the environmental work at Trelleborg Company focus currently on organization oriented environmental management (14001). Thus thinking of opting for one of the EL would make their environmental work be product oriented, which is a good way of implementing standards in the 14000 series. Combination of LC thinking should *start or continue* while implementing EMAS or ISO 14000 in the Company. This is important in the sense that it would partly facilitate their adoption of Type I and III in the long run.

To close, promotion of "green" products and encouragement of product management are major aims of the environmental product policies. Both ISO type I and II are based on life cycle thinking (gate to gate) while ISO Type III is based on a thorough LCA (cradle to grave). Thus, all types might play a role in promoting sustainable consumption and production and improved waste management. The labelling issue is one element of a wider strategy, which aims this at promoting these patterns among its societal, economic, environmental and political stakeholders. To that aim the strategy and the causal loop were designed in a holistic way that promotes environmentally and realistically aware behavioral patterns, which Trelleborg shall choose to meet the current and future demands of the stakeholders. Thus, it builds up an image of an industry, which steers its production and consumption patterns towards sustainability that satisfies its stakeholders.

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